Model AT 9500
Digital Transmission Analyzer

Maintenance Manual

Publication No. 35I052Z
Manual Part No. 320041

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First Edition
November 1990

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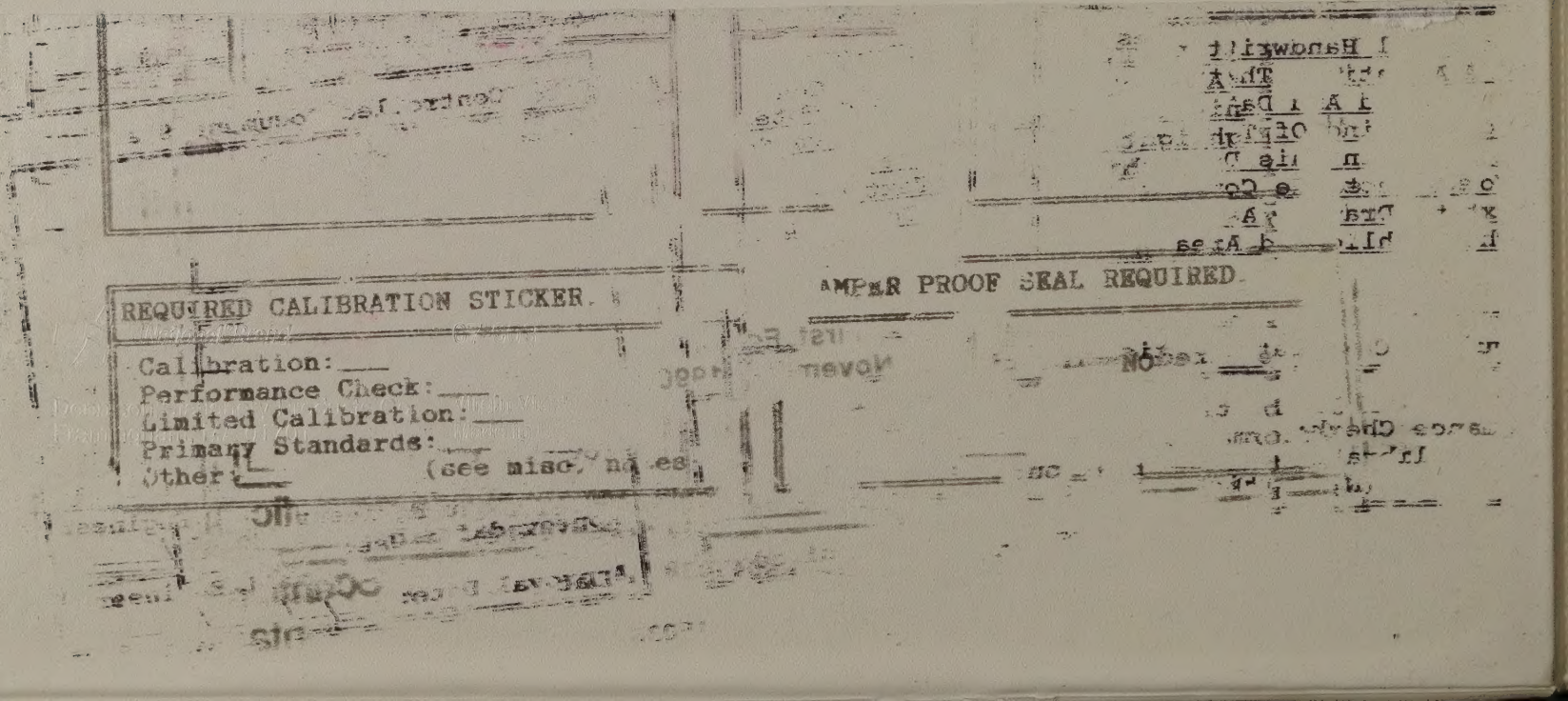
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Digital Transmission Analyzer

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TABLE OF CONTENTS

CHAPTER 1
USER'S GUIDE

Section		Page
1.1	What the Analyzer Does	1-1
1.2	Front Panel	1-1

CHAPTER 2
THEORY OF OPERATION

2.1	AT 9500 Analyzer	2-1
2.2	Transmitter	2-3
	2.2.1 Transmitter, DS3 Circuit	2-3
	2.2.2 Transmitter, DS1 Circuit	2-6
2.3	Demux	2-9
2.4	Signal Analysis Card	2-12
	2.4.1 Operational Overview	2-12
2.5	Real-Time Clock	2-15
2.6	Central Processing Unit (CPU)	2-15
2.7	Front Panel	2-15

CHAPTER 3
MAINTENANCE

3.1	Introduction	3-1
3.2	External Troubleshooting	3-2
3.3	Internal Troubleshooting	3-13
	3.3.1 How to Find Bad Cards Quickly	3-14
	3.3.2 Transmitter Card	3-22
	3.3.3 Demux Card	3-40
	3.3.4 Signal Analysis Card	3-79

TABLE OF CONTENTS – (continued)

Section			Page
	3.3.5	Diagnostic Test	3-98
	3.3.6	Mothercard	3-136
3.4		Regional Service Centers	3-137

CHAPTER 4
PARTS LISTS

4.1	General	4-1
4.2	Explanation of Parts List Column Headings	4-1
4.3	Ordering Parts	4-1
4.4	Directory	4-2

CHAPTER 5
DIAGRAMS

Diagrams		5-1

LIST OF ILLUSTRATIONS

Figure	Title	Page
1.1	AT 9500 Analyzer Front Panel	1-2
1.2	Connector Panel	1-2
1.3	Display Screen	1-3
1.4	STATUS Panel	1-3
1.5	RESULTS Panel	1-4
1.6	Typical STATUS Screen	1-4
2.1	AT 9500 Analyzer Block Diagram	2-2
2.2	Transmitter, DS3 Channel Block Diagram	2-4
2.3	Typical Waveforms, DS3 Channel	2-5
2.4	Transmitter, DS1 Channel Block Diagram	2-7
2.5	Typical Waveforms, DS1 Channel	2-8
2.6	Demux Block Diagram	2-10
2.7	Signal Analysis Block Diagram	2-13
2.8	DS3 Pulse Measurement	2-14
2.9	Real-time Clock Block Diagram	2-16
2.10	CPU Block Diagram	2-17
2.11	Front-panel Block Diagram	2-18
3.1	Troubleshooting Flowchart	3-4
3.2	Typical Sign-on Screen	3-5
3.3	Typical Summary Screen	3-6
3.4	Typical TIME Screen	3-6
3.5	SIGNAL ANALYSIS Setup Screen	3-8
3.6	Typical SIGNAL ANALYSIS Summary Screen	3-9
3.7	DS1 Transmitter Output Signal	3-10
3.8	SELECT XMTR Transmitter Screen	3-11
3.9	DS3 BERTS XMTR SETUP Screen	3-11
3.10	DS1 BERTS XMTR SETUP Screen	3-12
3.11	Removing Analyzer Top	3-15
3.12	Power Supply LEDs	3-16
3.13	Card Location	3-17
3.14	Removing Power Supply	3-18

LIST OF ILLUSTRATIONS – (continued)

Figure	Title	Page
3.15	Front-panel Cables	3-19
3.16	Supply Voltage Checkpoints.	3-20
3.17	DS1 Components of Transmitter Card	3-24
3.18	Analyzer Connection Cables	3-25
3.19	DS3 Components of Transmitter Card	3-31
3.20	DS3 DSX Transmitter Output Signal	3-32
3.21	SELECT XMTR Screen	3-35
3.22	DS3 BERTS XMTR SETUP Screen	3-35
3.23	Amplifier Z1 Input	3-36
3.24	Transmitter Bus Interface Components	3-38
3.25	Data Pattern 1010	3-41
3.26	SELECT XMTR Screen	3-42
3.27	DS1 BERTS XMTR SETUP Screen	3-43
3.28	DS1 Components of Demux Card	3-44
3.29	DS1 BERTS XMTR SETUP Page	3-47
3.30	Data Pulse with Framing Bit	3-48
3.31	SELECT XMTR Screen	3-50
3.32	DS1 BERTS XMTR SETUP Screen	3-50
3.33	SELECT XMTR Screen	3-52
3.34	DS1 BERTS XMTR SETUP Screen	3-53
3.35	DS1 BERTS XMTR SETUP Screen	3-54
3.36	Timing Diagram	3-56
3.37	DS1 BERTS XMTR SETUP Screen	3-57
3.38	DS3 Components of Demux Card	3-59
3.39	Demux Card Internal Cables	3-60
3.40	Voltage Checkpoints	3-61
3.41	Data Pattern 1010	3-62
3.42	SELECT XMTR Screen	3-62
3.43	DS3 BERTS XMTR SETUP Screen	3-63
3.44	DS3 BERTS RCVR SETUP Screen	3-64
3.45	SELECT XMTR Screen	3-66

LIST OF ILLUSTRATIONS – (continued)

Figure	Title	Page
3.46	DS3 BERTS XMTR SETUP Screen	3-67
3.47	DS3 BERTS XMTR SETUP Screen	3-68
3.48	Clock Pulse with Framing Bit	3-68
3.49	DS3 BERTS XMTR SETUP Screen	3-69
3.50	DS3 STATUS Screen	3-70
3.51	DS1 BERTS RCVR SETUP Screen	3-72
3.52	Demux LEDs	3-73
3.53	Timing Diagram	3-76
3.54	DS3 BERTS XMTR SETUP Screen	3-78
3.55	SELECT XMTR Screen	3-80
3.56	DS1 BERTS XMTR SETUP Screen	3-80
3.57	Data Pattern 1010	3-81
3.58	SIGNAL ANALYSIS Setup Screen	3-82
3.59	Typical SIGNAL ANALYSIS Summary Screen	3-82
3.60	DS1 Components of Signal Analysis Card	3-84
3.61	DS1 Transmitter Bipolar Signal	3-85
3.62	Signal Analysis Card Cables	3-85
3.63	SELECT XMTR Screen	3-89
3.64	DS3 BERTS XMTR SETUP Screen	3-90
3.65	Data Pattern 1010	3-90
3.66	SIGNAL ANALYSIS Setup Screen	3-91
3.67	Typical SIGNAL ANALYSIS Summary Screen	3-91
3.68	DS3 Components of Signal Analysis Card	3-93
3.69	DS3 Bipolar Signal	3-94
3.70	CPU LEDs and Dip Switches	3-99
3.71	CPU LED Sequence/Diagnostic Test	3-100
3.72	Diagnostic Test List	3-101
3.73	Rear Panel	3-102
3.74	Typical Sign-on Screen	3-104
3.75	Typical Summary Screen	3-104
3.76	Typical TIME Screen	3-105

LIST OF ILLUSTRATIONS - (continued)

Figure	Title	Page
3.77	Clock/Power Components of RTC Card	3-106
3.78	CPU Dip Switches and Dead-man Jumper	3-108
3.79	CPU Connector Voltage	3-110
3.80	Front-panel Flat-ribbon Cables	3-116
3.81	Replacing LCD Card	3-118
3.82	Front-panel Components	3-121
3.83	Front-panel Driver Components	3-122
3.84	Front-panel Driver U15 Output Pulses.	3-126
3.85	Front-panel Disassembly	3-127
3.86	10-Millisecond Interrupt Pulse	3-131
3.87	Typical 50-ms/200 μs Latch Pulse	3-132
3.88	Typical 50-ms/10 ms Latch Pulse	3-133

CHAPTER 1
USER'S GUIDE

NOTE

This chapter describes how to use the control and indicators of the AT 9500 Analyzer well enough to do maintenance. A detailed description of controls and indicators is in the OPERATOR'S MANUAL.

1.1 WHAT THE ANALYZER DOES

The AT 9500 Analyzer does out-of-service, in-service, end-to-end or loop tests for DS1 and DS3 circuits. The analyzer also detects automatic frame and pattern for DS1 and DS3 signals, offers help menus and stores in a RAM results of up to twelve tests.

A signal analysis card, for measuring waveform and frequency, is optional.

1.2 FRONT PANEL

The front panel of your AT 9500 Analyzer should look like Figure 1.1.

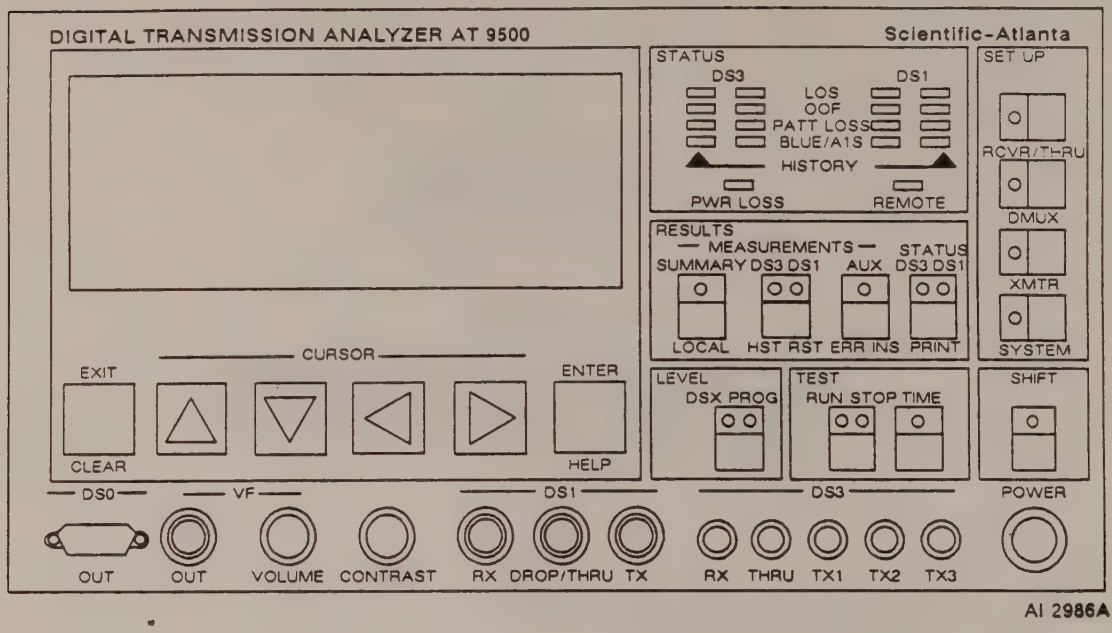

Figure 1.1. AT 9500 Analyzer Front Panel

The connector section is shown in Figure 1.2.

Figure 1.2. Connector Panel

The CONTRAST is for the LCD screen, and VOLUME controls the audio level of a front-panel speaker.

The screen looks like Figure 1.3.

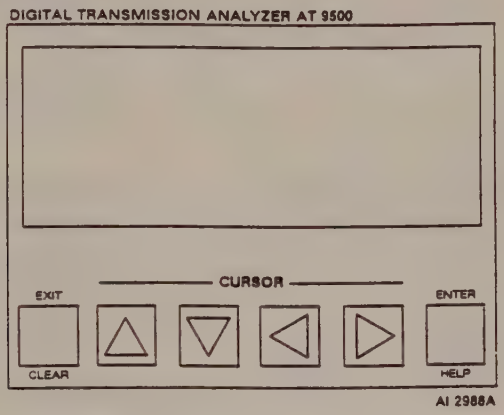

Figure 1.3. Display Screen

The liquid crystal display shows measurements and setup parameters. Pushing the ENTER key will select a test. Pushing the SHIFT key, then the HELP key, will get you help if you don't know how to set up a test.

Pushing the EXIT key moves the cursor to the top of the screen you are on; pushing the EXIT key again moves you to the previous screen. Push the EXIT key enough times and you'll get to the SUMMARY screen.

The STATUS panel is shown in Figure 1.4.

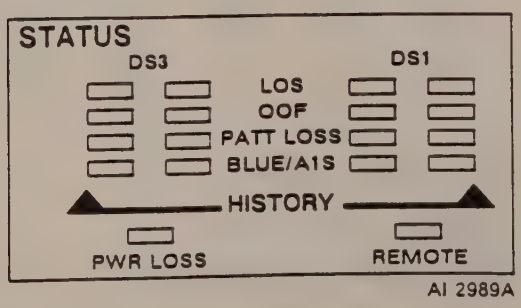

Figure 1.4. STATUS Panel

The STATUS section LEDs show current and historical status of DS1 and DS3 signals. Red indicates current status; yellow indicates historical status. The history can be cleared by pushing the SHIFT key (in the RESULTS section) and then the HST RST key.

The status conditions are loss of signal (LOS), out of frame (OOF), pattern loss (PATT LOSS), BLUE in DS3 and all 1s alarm (A1S) in DS1.

The PWR LOSS light tells you there was a power loss during a current test; the REMOTE light lets you know when the test set is being controlled by a computer or a data terminal.

The RESULTS panel is shown in Figure 1.5.

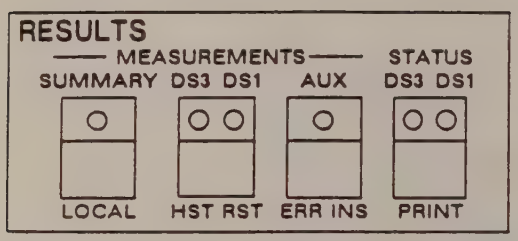

Figure 1.5. RESULTS Panel

Push the SUMMARY key and you will see the DS1 and DS3 error-second measurements. Push the SUMMARY key again, and you will see the DS3 and DS1 error-rate measurements. If you are measuring error-rate, the LED in the SUMMARY key will flash when you have new data.

Push the STATUS key and you will see signal, frame, and pattern summaries of DS3 and DS1. Figure 1.6 is a typical STATUS screen.

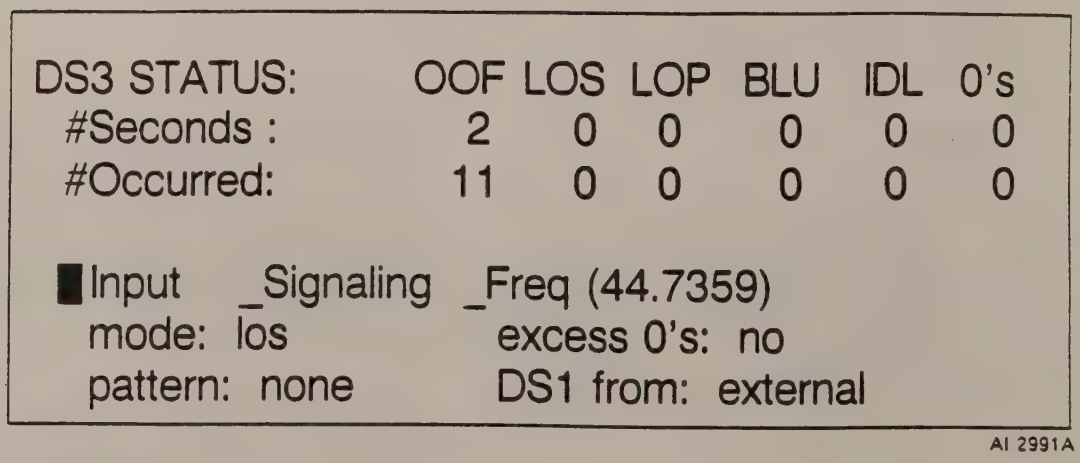

Figure 1.6. Typical STATUS Screen

Push the MEASURE key and you'll see DS3 and DS1 test data, together or separately, that has accumulated. Use the cursor keys to display the different measurement categories.

Push the AUX key and you can see the measurements made by the optional Signal Analysis card, if you have one. If you don't, pushing the AUX key will give you a screen message "NO AUX BOARD INSTALLED."

Use the SHIFT key to select options that are marked in red under some keys.

To disconnect the remote controller and change control to the front panel, push SHIFT and LOCAL.

To clear the HISTORY STATUS display, push SHIFT and HST RST. If you're doing an error-insert test, push SHIFT and ERR INS to insert errors into DS3 and DS1.

And if you want to print the output of the analyzer, push SHIFT and PRINT.

The SET UP, TEST and LEVEL controls are used for tests but aren't used for troubleshooting.

CHAPTER 2
THEORY OF OPERATION

Chapter 2 is the "How-It-Works" section; how the AT 9500 Analyzer works and how each of the cards within the analyzer works.

Chapter 2 is not a textbook theory of operation. In this chapter, we discuss theory at the same level of detail that we discuss troubleshooting.

The idea of a theoretical discussion of the analyzer is to give you some added information to help you troubleshoot. The diagnostic sequence in Section 3.3.5 thoroughly covers the circuits for the central processing unit, real-time clock and the front panel. Consequently, most of the detailed theory is for the cards not covered by the diagnostic sequence, the transmitter, the demux and the signal analysis card.

2.1 AT 9500 ANALYZER

Figure 2.1 is a block diagram of the AT 9500 Analyzer.

The word "analyze," as applied to the AT 9500 Analyzer, means it demultiplexes, analyzes and tests. It can be used on telecommunications circuits that are being used or are out of service; it does end-to-end tests, loopback tests, and THRU mode tests. Status of the signals being tested is shown on a front-panel display, or, from a serial port, printer or CRT, or both.

The demux card (with or without demultiplexing) decodes, frames, recognizes line patterns, and detects and counts all errors in the DS1 and DS3 signal. The demux card demultiplexes DS1 or DS3 down to DS0.

The transmitter card originates DS1 and DS3 data, adds framing bits, inserts errors and the bipolar code.

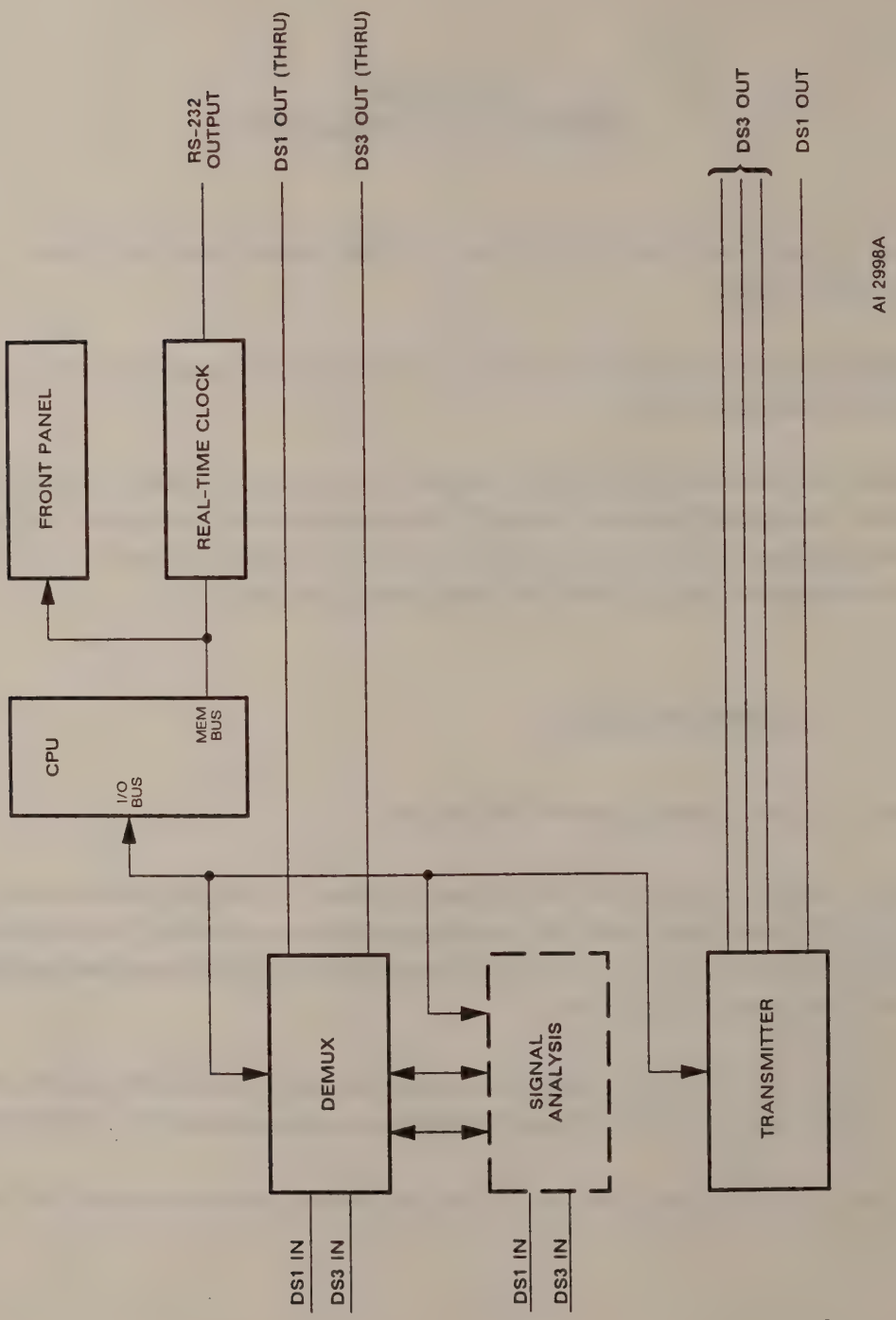

Figure 2.1. AT 9500 Analyzer Block Diagram

The central processing unit (CPU) controls the operation and reads status and error count from the DS1 and DS3 and calculates the required measurements to display on the front panel.

The real-time clocks provide the time reference, non-volatile RAM, serial and GPIB interfaces.

A separate signal analysis card (shown in dotted lines in Figure 2.1) is an option and does a more extensive analysis.

2.2 TRANSMITTER

2.2.1 Transmitter, DS3 Circuit

Figure 2.2 is a block diagram of the DS3 channel of the transmitter, and Figure 2.3 shows waveforms at different places in the block diagram.

The source of the DS3 clock pulse can be the internal temperature-compensated crystal oscillator (TCXO), or an external clock source, or a loop-timed clock pulse from the demux card. The internal and external clock sources are (physically) on the transmitter card and the loop-timed clock is derived from the DS3 input on the demux card. Which clock the operator chooses depends on what kind of test he is running.

The output of buffer U3, properly adjusted with potentiometer R2, is a 44.736 MHz clock pulse with an approximately 50/50 duty cycle, shown as (A) in Figure 2.3. (Procedures for making this adjustment are given in Chapter 3, Maintenance, Section 3.3.2.)

U6 passes the selected clock pulse to U5 and the output of U6 (B) should be identical to the output of U3.

With the framing off, the clock output of U5 (C1) is unchanged from U6 but with the framing turned on, the clock output from U5 (C2) to U4 will have gaps in it, corresponding to the framing bit locations.

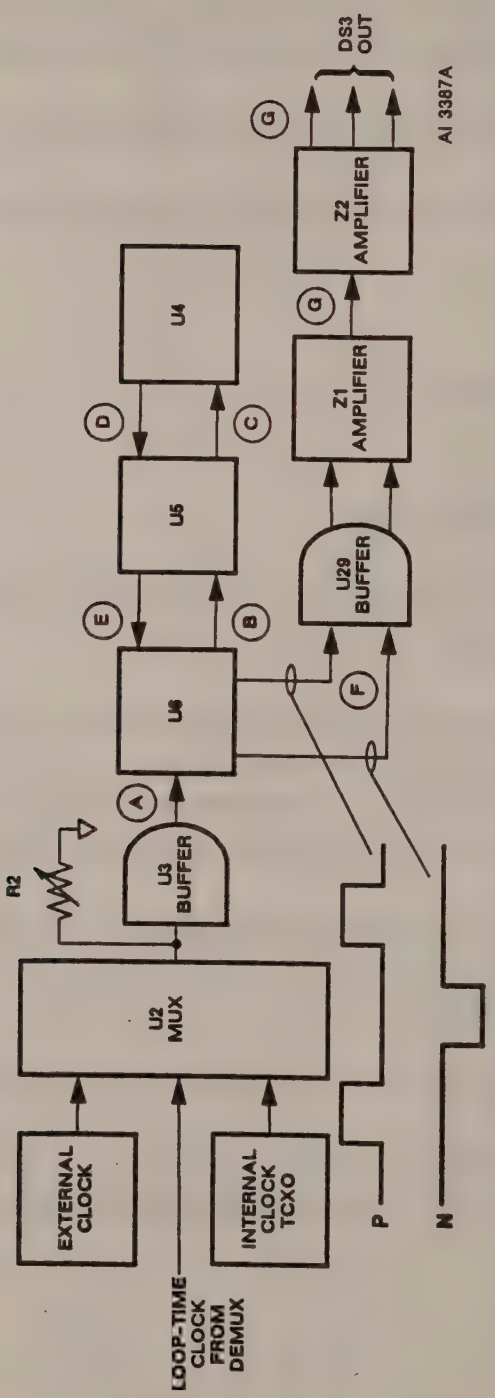

Figure 2.2. Transmitter, DS3 Channel Block Diagram

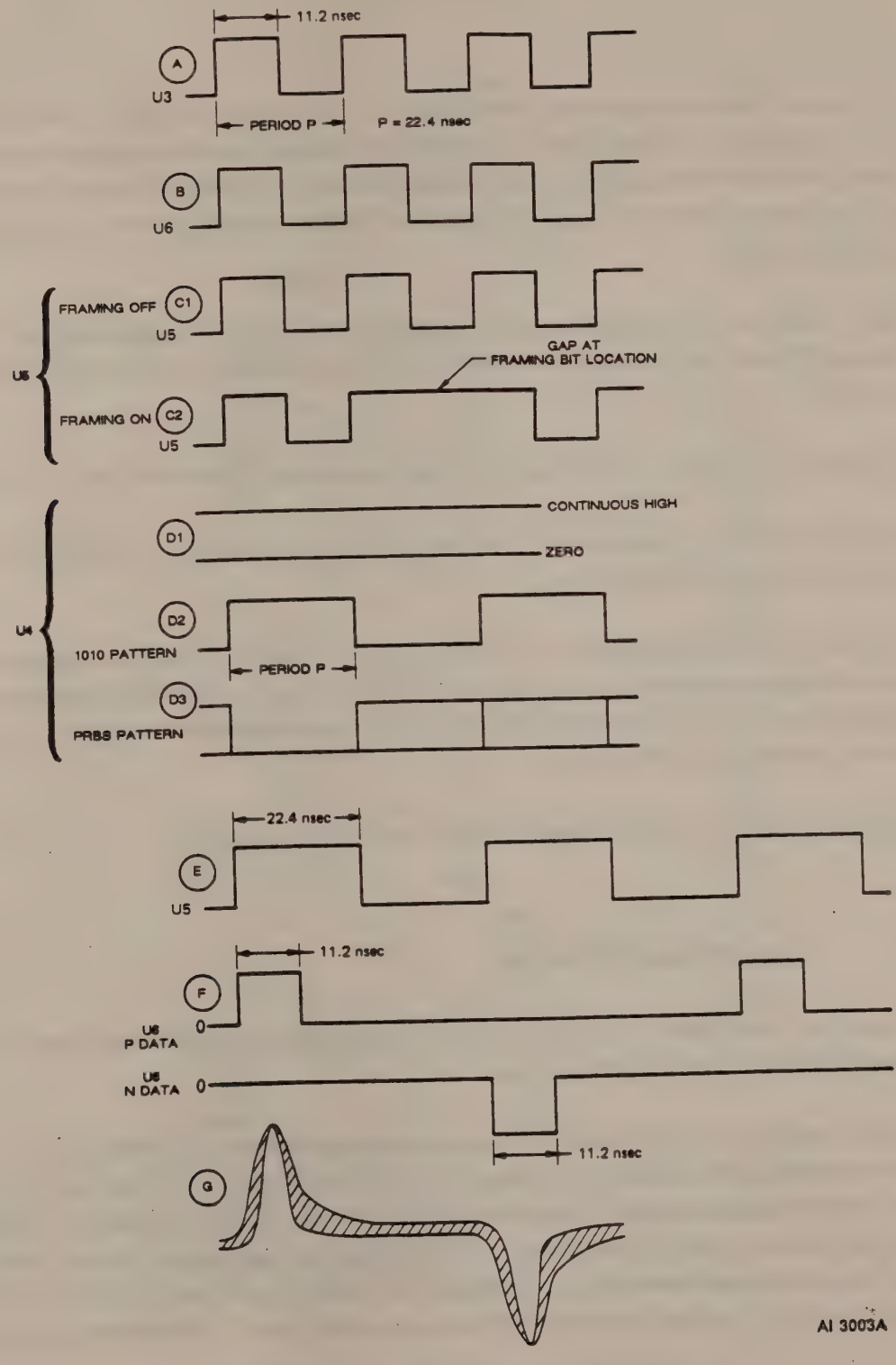

Figure 2.3. Typical Waveforms, DS3 Channel

The output of U4 depends on the data pattern the operator has set into the analyzer. A fixed data pattern of all "1s" would give you a continuous high output (D1); a 1010 data pattern will give you positive-going pulses (D2) and a pseudorandom bit sequence (PRBS) pattern will give you a random positive-going and negative-going pattern similar to (D3) of Figure 2.3. Exactly how the PRBS pattern looks depends on how the operator has triggered his scope.

The waveform from U5 to U6 again depends on the data pattern set into the analyzer, but, for instance, a 1010 pattern (D2) should give you the same waveform (E), at the output of U5, as at the output of U4 (D2), but with framing bits.

U6 produces two streams, or rails, of data (F) -- p data and n data ("p" for positive, and "n" for negative).

The p data stream has a positive pulse on alternate "1s"; the n data stream has a negative pulse on every "1" the p data stream didn't go positive on.

These two data streams go to amplifier Z1, through buffer U29. Amplifier Z1 combines and shapes the two data streams to produce the bipolar signal. Waveform G is the general shape of a DS3-DSX bipolar signal with a 1010 data pattern. For a HI level output, the pulses would be more squared-off than G and for a LO level output, the pulses would be more rounded.

Amplifier Z2 has three 75-ohm outputs to drive the three front-panel outputs.

2.2.2 Transmitter, DS1 Circuit

Figure 2.4 is a block diagram of the functions of the DS1 channel of the transmitter, and Figure 2.5 shows waveforms at different places in the block diagram.

The DS1 clock source can be the internal temperature-compensated crystal-oscillator, an external clock source, or loop-timed clock source from the demux card. The internal and external clocks are physically on the transmitter card and the loop-timed clock is derived from the DS1 input on the demux card. Which clock the operator chooses depends on what kind of test he is running, but regardless, the output of buffer U11, properly adjusted with potentiometer R3, is a 1.544 MHz clock, with an approximately 50/50 duty cycle, shown as (A) in Figure 2.5. (Complete adjustment procedures are given in Chapter 3, Maintenance, Section 3.3.2.)

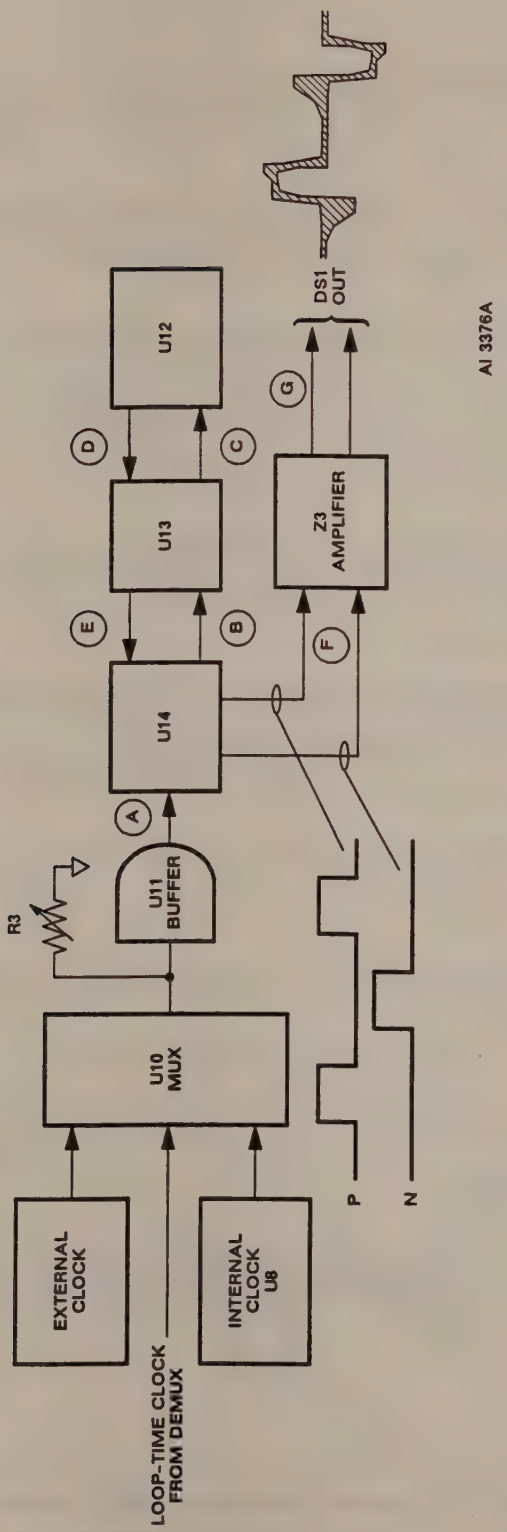

Figure 2.4. Transmitter, DS1 Channel Block Diagram

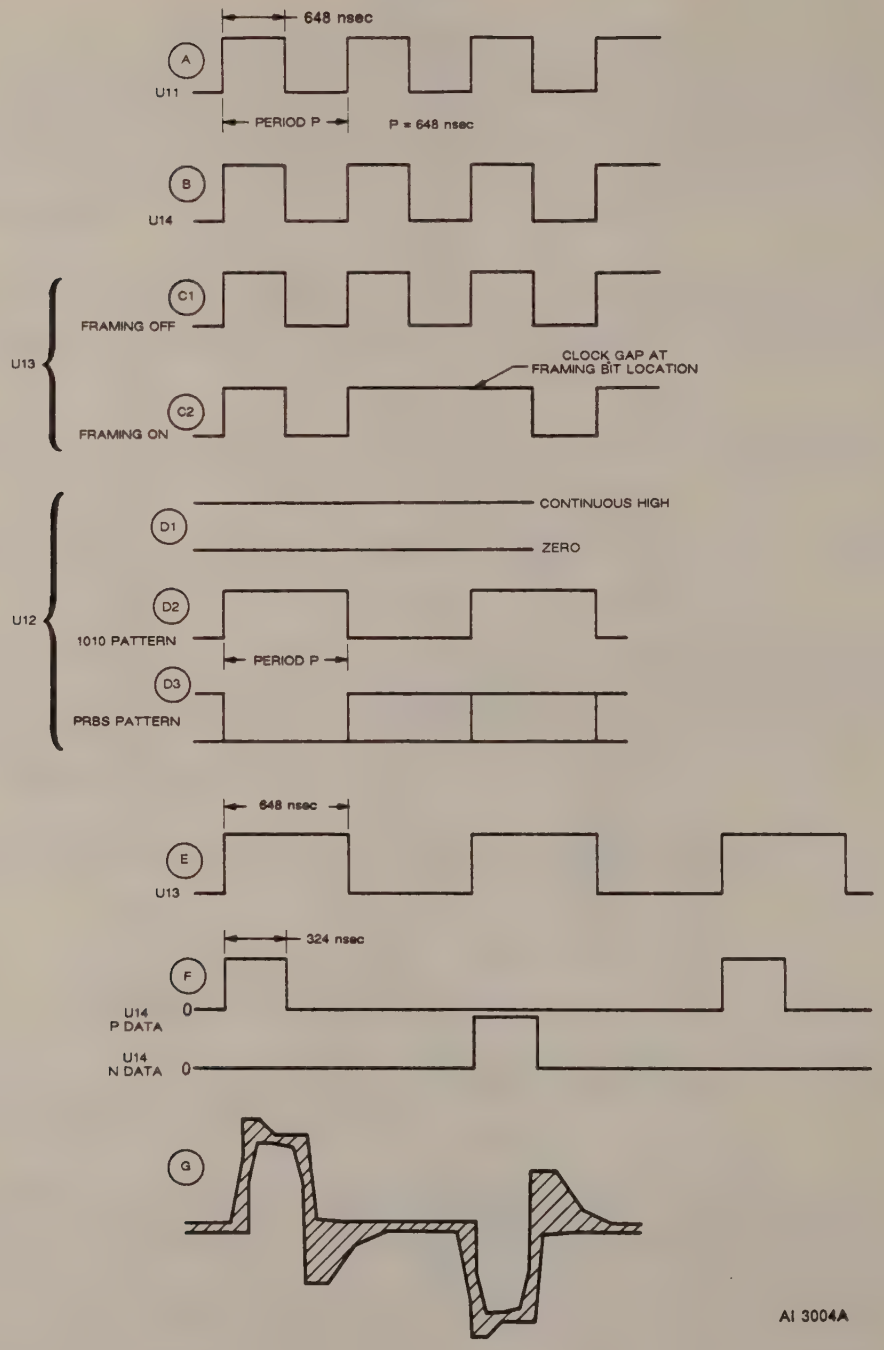

Figure 2.5. Typical Waveforms, DS1 Channel

Clock Recovery Chip U14 passes the selected clock pulse to U13 and the output of U14 (B) should be identical to the output of U11.

With no framing added, the output pulse of U13 is unchanged from U14 (C) but with framing on, the clock pulse from U13 (C2) to U12 will have gaps in it, the gaps corresponding to framing bit locations.

The output of U12 depends on the data pattern set into the analyzer. A fixed data pattern of all "1s" would give you a continuous high output (D); a 1010 data pattern will give you positive going pulses (D2) and a PRBS pattern will give you a random positive-going and negative-going pattern similar to the third waveform under (D3) of Figure 2.5. Exactly how the PRBS pattern looks depends on how the operator has triggered his scope.

The waveform from U13 to U14 again depends on the data pattern set into the analyzer, but, for instance, a 1010 pattern (D) should give you the same waveform at the output of U13 as at the output of U12 (E), but with framing bits.

Chip U14 produces two streams, or rails, of data (F). The p data stream has a positive pulse on alternate "1s" in the data pattern, and the n data stream has a positive pulse on every other incoming "1" the p data stream didn't go positive on (U14 inverts the n data stream).

These two data streams go to amplifier Z3, where they are combined and shaped to produce the bipolar signal.

In Figure 2.5, waveform G is approximately how a DS1 bipolar signal looks when produced by a 1010 data pattern.

2.3 DEMUX

The demux is a receiver that analyzes and demultiplexes a DS3 signal down to DS1 or DS0, or demultiplexes a combination of DS3 and DS1 signals down to DS0. Figure 2.6 is a block diagram of the demux.

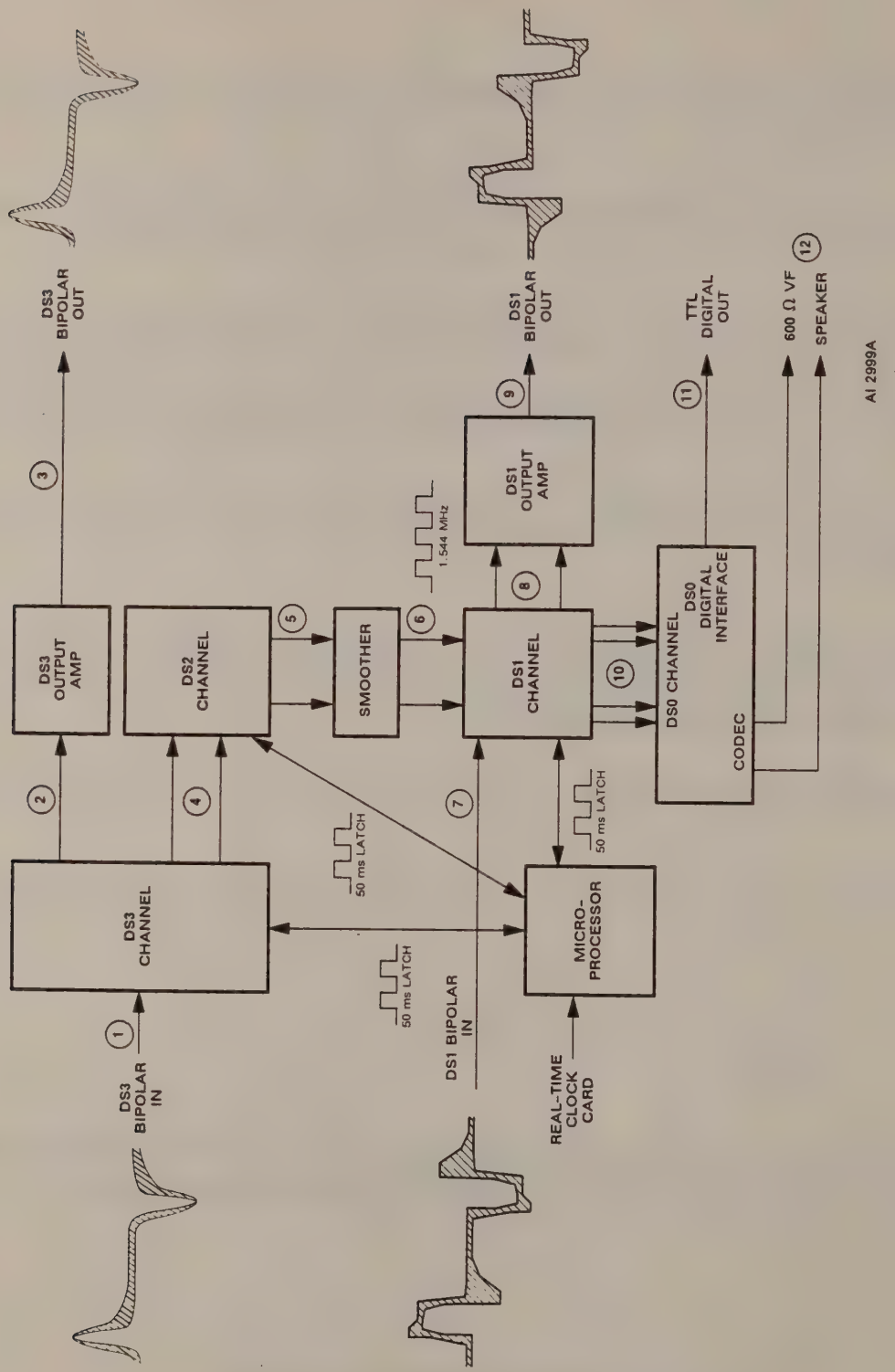

Figure 2.6. Demux Block Diagram

The operator may choose to analyze a DS1 or a DS3 signal without demultiplexing it. With the 9500 Analyzer in the THRU mode, the signal can be analyzed, errors can be inserted and the signal can be recoded and reframed. In this case, the DS3 signal (1 on Figure 2.6) or DS1 signal (7) comes into the receiver where it is analyzed and regenerated. THRU output is available on the front panel of the analyzer as DS3 (3) or DS1 (9).

The demux card (with or without demultiplexing) decodes, frames, recognizes line patterns, and detects and counts all errors in the DS1 and/or DS3 signal.

In summary, you can analyze a DS3 or an external DS1 signal, together or separately, without demultiplexing. Or you can demux a DS1 from the DS3 and analyze it, or you can demux a DS0 from any DS1.

During demultiplexing, status is available on the front-panel screen or at a remote interface (or both) at the DS2 stage of demultiplexing, but not at the DS0 stage.

You can monitor the DS0 signal as TTL level digital (11), 600-ohm VF or a VF audio signal to an internal speaker (12).

The error and status data are latched on a 50-millisecond interval by a signal from the microprocessor and the real-time clock card. The microprocessor reads data from, and writes set-up information directly to the DS3 channel.

The bipolar DS3 input signal (1) goes to channel circuit and data pulse and clock pulse are recovered. The channel circuit also does bipolar, three zero-substitution (B3ZS), line-decoding and encoding, framing, it recognizes the pattern, detects and counts errors, and demultiplexes out the DS2 signal (4).

The DS2 signal, selected to be demultiplexed from the DS3, goes to the DS2 channel (4) on Figure 2.6. There, the DS2 channel frames, checks status, and demultiplexes a DS1 output signal. The microprocessor reads and writes directly to the DS2 receive channel.

The clock and data (6) out of the DS2 channel is smoothed, and sent to the DS1 channel. Again, the DS1 channel frames, recognizes pattern and detects and counts errors, checks status, and demultiplexes a DS0 signal out of the DS1 signal.

The operator has the choice of the DS1 channel receiving DS1 bipolar signal (7) or the demuxed DS1 which has been smoothed (6). The microprocessor can count errors and check status directly from the DS1 receive channel.

The DS1 output amplifier (8) is driven directly from the DS1 receive channel, and provides a bipolar DS1 signal (9) to the front panel of the analyzer.

The DS0 channel receives the output of the DS1 channel and gives you three different outputs. The Codec output is either a 600 ohm VF signal, or TTL DS0 signals (11) of clock, data, and a sync pulse or an audible signal heard on a front-panel speaker.

2.4 SIGNAL ANALYSIS CARD

The Signal Analysis card is an option to the AT 9500 Analyzer. When it is used, here's what it does.

- Measures analog characteristics of DS1 or DS3 signals, including peak positive and negative voltage, average pulse width and pulse symmetry.
- Establishes a baseline zero, so the peak positive and negative voltages are measured against that zero, and not just ac zero.
- Measures the average pulse width at 25%, 50% and 75% of the pulse amplitude. From these measurements, pulse symmetry is calculated and these calculations give you an approximate comparison of the power in positive pulses to power in negative pulses.

2.4.1 Operational Overview

Figure 2.7 is a block diagram of the Signal Analysis card.

DS1 and DS3 signals are inputs to the signal analysis card and are buffered to the demux card. When signal analysis is chosen, the DS3 and DS1 signals are measured alternately, at the rate of about 1 second per signal.

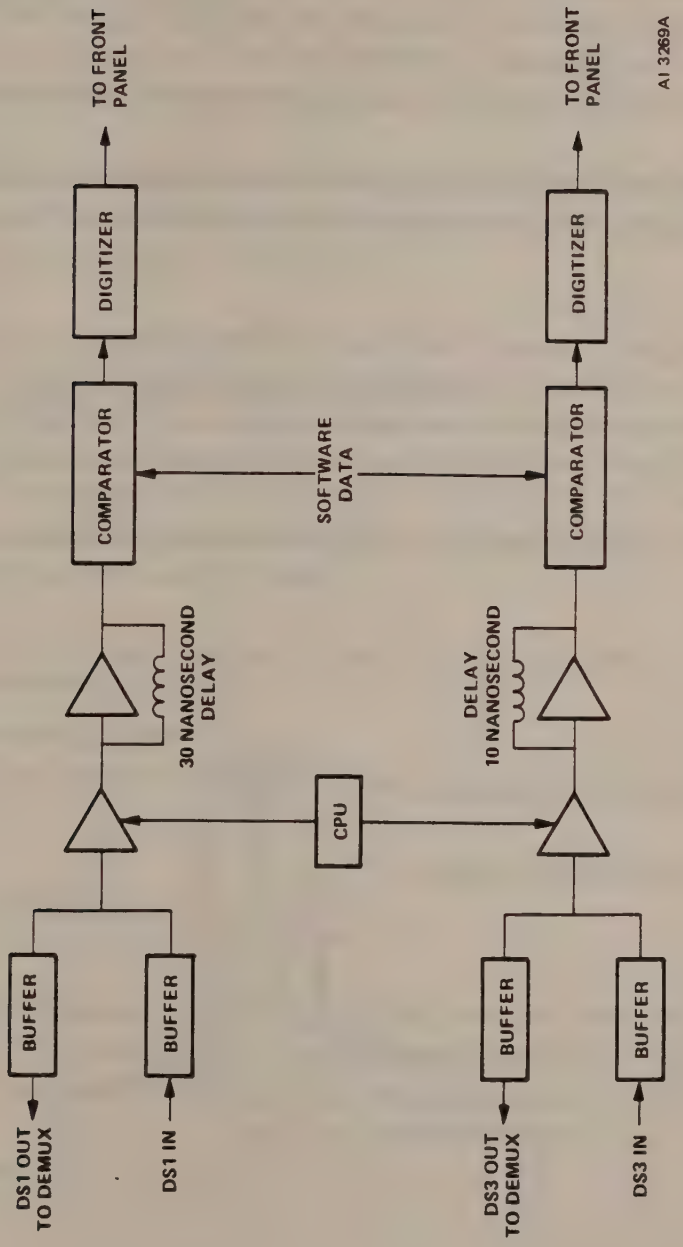

Figure 2.7. Signal Analysis Block Diagram

During that 1 second measurement cycle, the Signal Analysis circuit finds baseline zero, not just ac zero but where you would put baseline zero if you looked at the scope display. It also sets a trigger point, finds + and - peaks, measures the pulse widths at 25%, 50% and 75% of the pulse amplitude, computes the pulse symmetry, and sends all this data to the CPU, which relays the data on to the front panel.

The bipolar signal is switched to the comparator with a signal from the CPU. However, before the bipolar signal gets to the comparator, it is delayed 10 nanoseconds for the DS3 signal and 30 nanoseconds for the DS1 signal.

The trigger point, that is, the point in time when the measurement sequence starts, is determined by the software. In either case (DS1 or DS3) the trigger point on the leading, not-delayed, original pulse starts the sweep circuit, which in turn triggers the actual pulse measurement on the trailing, delayed pulse. The pulse measurement starts 10 nanoseconds after the trigger for DS3 pulse and 30 nanoseconds after the DS1 pulse.

See Figure 2.8 for an example where the measurement to be made is pulse width at 25% of pulse amplitude on a DS3 pulse.

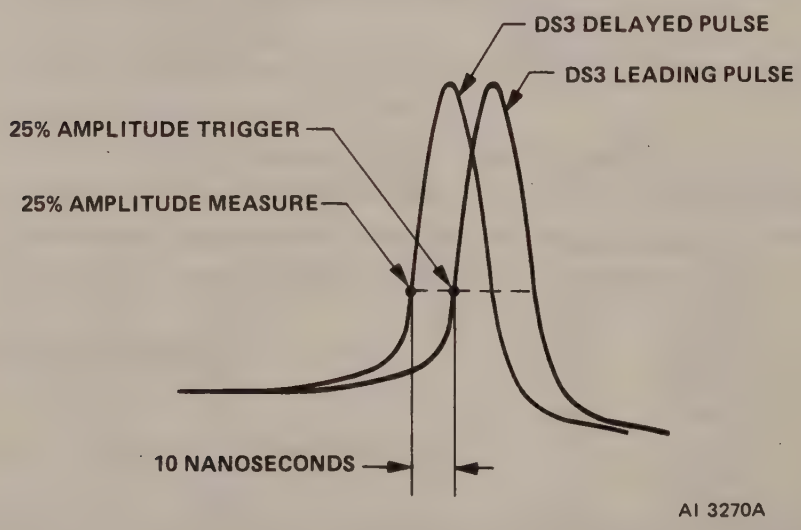

Figure 2.8. DS3 Pulse Measurement

2.5 REAL-TIME CLOCK

Figure 2.9 is a block diagram of the real-time clock.

The real-time clock card, in addition to supplying the time and date, provides static and non-volatile RAM, battery power for the real-time clock and NV RAM, a power-on reset, a power-fail detect, dead-man time and the RS-232 and General Purpose Interface Bus (GPIB).

2.6 CENTRAL PROCESSING UNIT (CPU)

Figure 2.10 is a block diagram of the CPU. Most of the circuit is in an AT Compatible Chip Set. For a detailed discussion of the 80286 Microprocessor and the AT Compatible Chip Set, refer to any standard handbook on MOS Microprocessors and Peripherals.

The CPU also has 256 Kbytes of EPROM, 512 Kbytes of dynamic RAM and bus interface and arbitration circuits.

The EPROM is programmed for each specific configuration of the AT 9500 Analyzer.

2.7 FRONT PANEL

Figure 2.11 is a block diagram of the front panel. All the switches and controls for the AT 9500 Analyzer are on the front panel. The status of the signals being analyzed or demultiplexed are formatted by the CPU and then displayed. The same status information is also available over the remote interfaces.

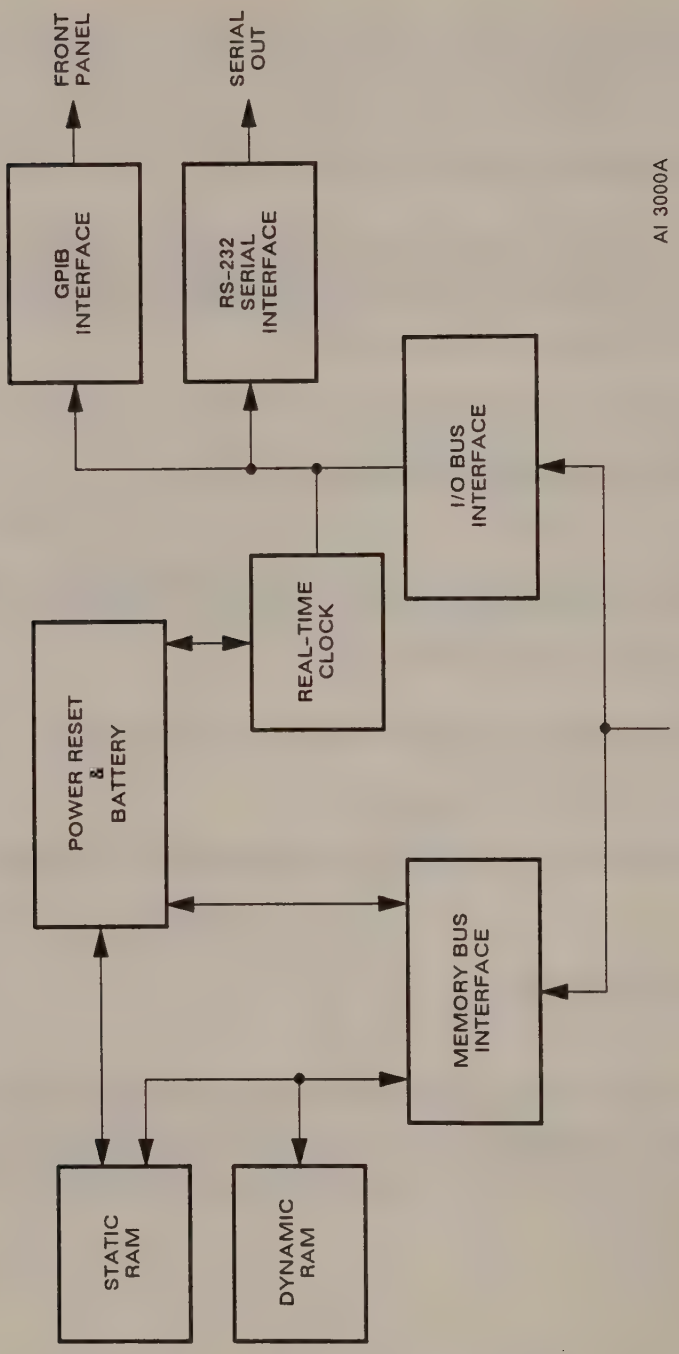

Figure 2.9. Real-Time Clock Block Diagram

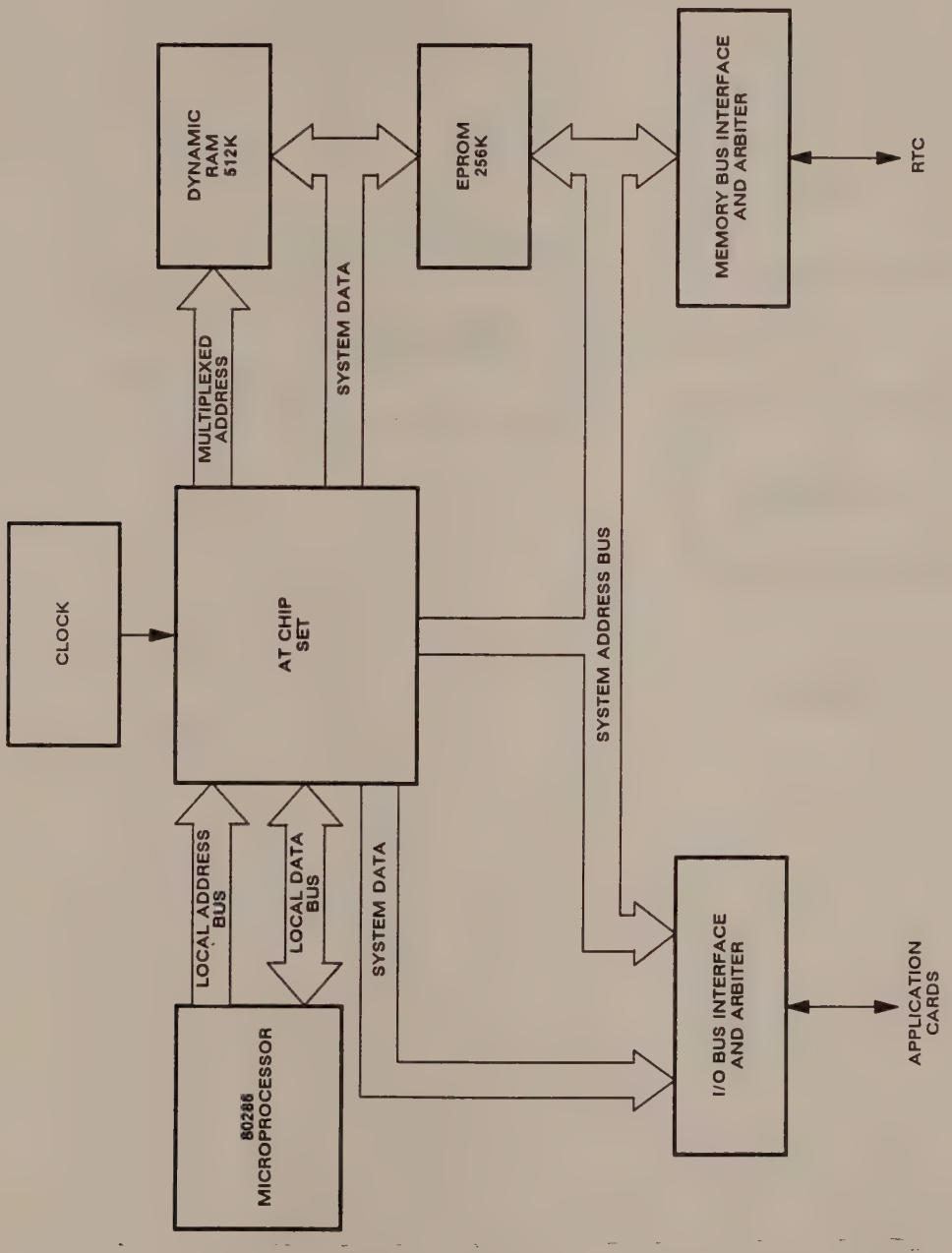

Figure 2.10. CPU Block Diagram

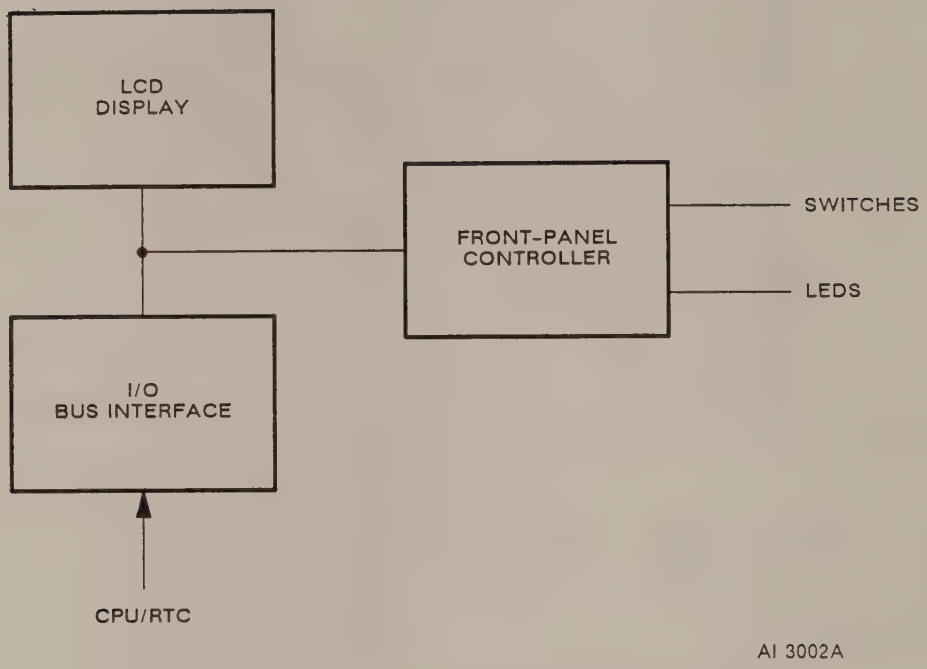

Figure 2.11. Front-panel Block Diagram

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COMMUNICATIONS TECHNOLOGY

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From:	Bob Palmer	Communications Technology Corp.
Questions?	Call (404)931-4656 x105 Fax (404) 931-4557	2825 Breckinridge Blvd NW Suite 120 Duluth, GA 30136
To:	Kelly Duncan	
Company:	Gte-north	
Address:		
Date:	March 1, 1994	
Time:	3:42 PM	Pages: 14 (including this one)

Message:
Kelly , here it is
Bob Palmer

SCIENTIFIC-ATLANTA, INC.

MODEL AT9500

DIGITAL TRANSMISSION ANALYZER

FIELD CALIBRATION PROCEDURE

Date: 12-17-92 Revision: B Reviewed: 12-23-92

Approved by: Author: David W. Watson

Factory Service Manager: James H. Smith

S-A P/N 492677

SCIENTIFIC ATLANTA
PROPRIETARY DATA

MAR 02 '94 04:51PM CTC BROADBAND TEST A P.2

SCIENTIFIC-ATLANTA
SERIES AT9500 DIGITAL TRANSMISSION ANALYZER
FIELD CALIBRATION PROCEDURE

1.0 INTRODUCTION

1.1 This document will describe the procedures necessary to test the performance of and align a Model AT9500 Digital Transmission Analyzer. Performance equal or superior to the test limits set forth herein is deemed conclusive evidence of the acceptability of the instrument under test. A test data record is provided for making a permanent record of the test results.

1.2 All information contained in this document is considered company proprietary, and as such, is the sole property of Scientific-Atlanta. This document is not for sale or release to any other persons than those employed by Scientific-Atlanta.

2.0 REFERENCE INFORMATION

1. Model AT9500 Digital Transmission Analyzer Maintenance Manual
2. Production Test Procedure for DS3/DS1 Transmitter
3. Production Test Procedure, DS3/DS1 Demux
4. Test Procedure for DTA/DAS Analog Board

3.0 TEST EQUIPMENT REQUIRED

3.1 The following test equipment, or its equivalent, is required to perform the tests in this procedure. All test equipment must be certified in calibration and working within its specified accuracy.

ITEM	MODEL	QTY.	MANUFACTURER
Digital Volt Meter	3466A	1	Hewlett-Packard
Digital Transmission Analyzer	AT9500	1	Scientific-Atlanta
Signal Generator	8656B	1	Hewlett-Packard
Frequency Counter	548A	1	EIP
Waveform Test Set	A931	1	Scientific-Atlanta
Wide Band Amplifier	8447E	1	Hewlett-Packard
75 Ohm Attenuators	306118	1	Scientific-Atlanta

4.0 VERIFICATION/ALIGNMENT

4.0.1 Testing must be performed by a qualified Scientific-Atlanta service representative. The calibration will be conducted according to the procedures set forth in this document.

MAR 02 '94 04:51PM CTC BROADBAND TEST A P.3

4.0.2 Data that is taken during the pre-calibration and post-calibration will be recorded on a Calibration Data Record Sheet. The completed form will be maintained and available for review. Pre-calibration data is taken to ensure the instrument has remained within certification tolerances. If the pre-calibration data is within tolerances, it can be used as the post-calibration data. If not, an Out-of-Tolerance Notification must be generated and the unit then aligned to meet all its certified tolerances.

4.0.3 A complete set of blank data forms are located at the end of this document. Copies of these forms shall be reproduced as needed for recording calibration data. Following completion of calibration, the completed copy of the from shall be given to the appropriate customer representative. The original forms shall be kept on file for a period of not less than two years.

4.0.4 No maintenance or adjustments shall be made prior to obtaining all pre-calibration data so that the malfunction of any equipment may be noted.

4.0.5 On alternating calibrations, or at the discretion of the Scientific-Atlanta representative, the steps set forth for alignment called out in this procedure will be performed between the gathering of pre- and post-calibration data regardless of the conditions found with the equipment. This will be done as a preventative measure to ensure quality operation.

4.1 Power Supplies

4.1.1 The following measurements are adjusted on the Power Supply assembly located at the rear of the unit. If the power supplies require adjustment, remove the protective cover from the Power Supply assembly and locate the appropriate pots.

4.1.2 Remove the Real Time Clock PWB assembly and place on an extender card. With the DVM connected to J1 pin 30 (ground to chassis), measure the negative DC supply. It must read -5.20 volts +-.25 VDC. If not, adjust R9 until the voltage is correct.

4.1.3 Connect the DVM to J1 pin 31 (ground to chassis), and measure the positive DC supply. It must read +5.00 volts +-.25 VDC. If not, adjust R14 until the voltage is correct.

4.1.4 If all power supply measurements are within tolerance, check OK on the data sheet. If the Power Supply cover has been removed, reinstall it before proceeding.

4.2 Real Time Clock Adjustment

4.2.1 Prior to adjusting the Real Time Clock assembly, look at the left side of the Motherboard assembly. If the unit under test has a small plug-in type crystal, it will be necessary to adjust it first. Attach the frequency counter to U67, pin 11, and adjust

MAR 02 '94 04:51PM CTC BROADBAND TEST A P.4

the capacitor located near the crystal for a frequency of 6.176000 MHz +-8 Hz.

4.2.2 Attach the frequency counter to pin 11 of U27, located on the Real Time Clock assembly. Adjust C1 for a frequency of 32.768 MHz. Use a X10 scope probe with a 100K ohm resistor attached to the tip to make this measurement.

4.3 Transmitter PWB Assembly

4.3.1 Remove the Real Time Clock from the extender card and place it back in its slot. Place the Transmitter PWB assembly on the extender and apply power.

4.3.2 Connect the frequency counter to J24 and verify the frequency read is between 6.175992 and 6.176008 MHz.

4.3.3 Connect the frequency counter to TP2 and adjust C1 for a frequency of 44.736000 MHz +-.000002 MHz.

4.3.4 If the unit under test is a E version, connect the frequency counter to TP3, and adjust C3 for a frequency of 2.04800 MHz +- 8 Hz. If all applicable frequencies are within tolerances, check OK on the data sheet

4.3.5 If the transmitter is a non-external clock type, connect the frequency counter to TP1 and verify the frequency to be 1.544000 MHz.

Note: The next steps in this procedure call for measuring the transmitted signal specifications. If at any time these readings do not fall within tolerance, it is an indication of a PWB failure. If this condition occurs, perform repairs as necessary to the PWB before continuing with this procedure.

4.3.6 Remove power from the unit and place the Transmitter PWB in its slot. Power up the unit and connect the DS1 output to the input of the A931 Waveform Test Set. Select the Transmitter page on the UUT, and configure the DS1 transmitter for SF framing, 1010 pattern, AMI coding. Configure the A931 for DS1 testing, and verify the A931 is indicating all green lights (a passing condition), and no red failure lights are illuminated. Set the A931 to read symmetry, - width, + width, - VP and + VP levels. Record these readings on the data record.

4.3.7 Disconnect the DS1 cable from the A931, and connect a cable from the DS3 output port to the DS3 input of the A931. Select the Transmitter page on the UUT, and configure the DS3 transmitter for M13 framing, 1010 pattern, DSX level. Select DSX3 on the A931, and verify symmetry, - width, + width, - VP and + VP levels. Record these readings on the data record.

MAR 02 '94 04:52PM CTC BROADBAND TEST A P.5

4.3.8 Configure both the UUT and the A931 for DS3-HI, and repeat the tests performed in Step 4.3.7. Record the results on the data record.

4.3.9 Configure both the UUT and the A931 for DSX3-MON, and repeat the tests performed in Step 4.3.7. Record the results on the data record.

4.5 Demux PWB Assembly

4.5.1 Remove power from the UUT. Remove the Demux PWB assembly, and install it on the extender card. Apply power to the UUT.

4.5.2 Remove any input signal to the Demux assembly. Place the jumper at J17 on pins 1 and 2. Connect the frequency counter to TP2. Adjust R77 for a frequency of 1.60 MHz. Short pin 6 of U24 to the -5.2 VDC supply. Adjust R76 for a frequency of 1.49-1.50 MHz. Repeat these adjustments until the proper frequencies are obtained. Remove the short from pin 6.

4.5.3 Place the jumper at J18 on pins 1 and 2. Connect the frequency counter to TP1. Adjust R29 for a frequency of 48 MHz. Short pin 6 of U9 to the -5.2 VDC supply. Check for a frequency of 40 MHz.

4.5.4 Remove unit power, and replace the jumpers at J17 and J18 to their proper positions. Remove the Demux PWB assembly from the extender, and place it back in its slot. Reapply power to the unit.

4.5.6 Set both the DS1 and DS3 transmitters for a PRBS-15 pattern, and connect them in a back-to-back fashion. Ensure the DS3 transmitter and receiver are set for a DSX level. Select DS1 STATUS from the front panel, and verify the recovered clock to be 1.54400 MHz. Select DS3 STATUS, and verify the recovered clock to be 44.7365 MHz.

4.5.7 Configure the unit under test for an receiver input at DS3 HI LEVEL. Remove the UUT DS3 transmitter output from the UUT receiver input. Connect the test equipment as shown in Figure 1. Set the A931 for DS3-HI, dBx level measurement, and adjust the attenuators for a reading of +3.8 dBx +-.2 dBx. Remove the cable from the A931 and connect it to the UUT receiver input. Ensure the unit will lock up on that signal. If so, check OK on the data record.

4.5.8 Connect the test equipment a shown in Figure 2. Set the A931 for DSX3-MON. Adjust the attenuators and reduce the signal to a level of -26.0 dBx. Remove the cable from the A931 and connect it to the UUT receiver input. Ensure the unit will lock up on that signal. Start an untimed test, and verify the unit does not produce random errors of any type while running. Let the test run for a duration of no less than 2 minutes. If no errors occur, check OK on the data record.

MAR 02 '94 04:52PM CTC BROADBAND TEST A P.6

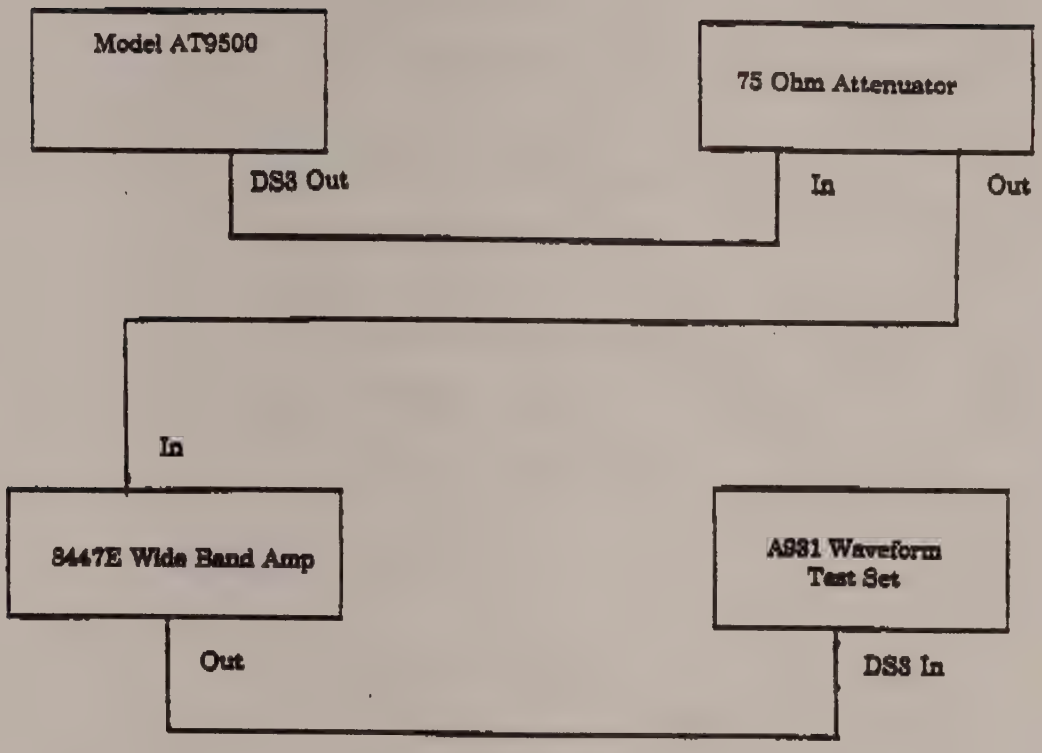


Figure 1

P.7

MAR 02 '94 04:53PM CTC BROADBAND TEST A

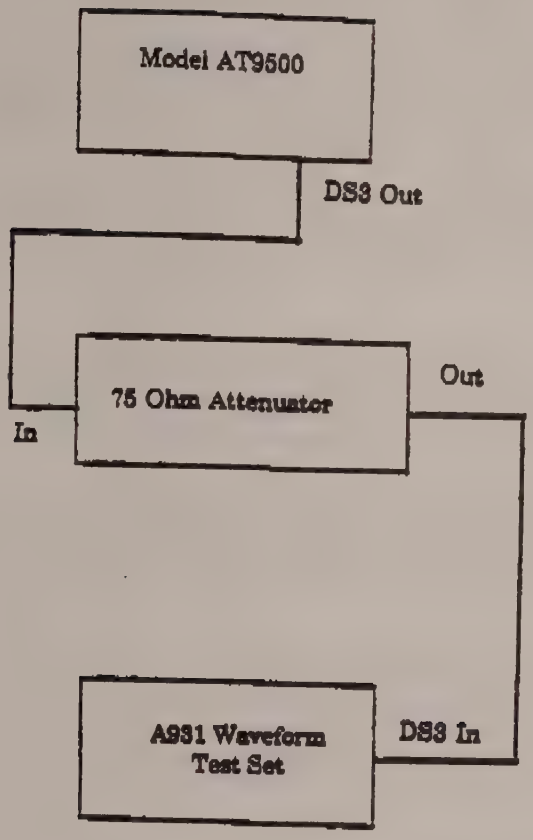


Figure 2

P.8

MAR 02 '94 04:53PM CTC BROADBAND TEST A

4.6 Signal Analysis Option

4.6.1 Remove power from the unit under test and place the Signal Analysis PWB on an extender card. Power up the unit and configure the unit under test for back-to-back operation. Set the DS3 transmitter and receiver for a DSX level, 1010 pattern.

4.6.2 Select the analysis function from the front panel. Examine first the DS3 signal. Ensure the measured signal falls within the specifications as given in Step 4.3.7. If so, check OK on the data record. If not, proceed with Step 4.6.4.

4.6.3 Examine the DS1 signal. Ensure the measured signal falls within the specification as given in Step 4.3.6. If so, check OK on the data record, and proceed to Step 4.7.1. If not, proceed to Step 4.6.6.

Note: The following steps are interactive, and may need to be performed more than once to acheive the required results. If, after performing these steps, the unit still fails to meet specifications, the PWB assembly is in need of repair.

4.6.4 Set the DS3 transmitter for DSX, UNFRAMED, and a 1010 pattern. Select the signal analysis function, and examine the DS3 signal. Adjust R176 such that the sum of the plus and minus peak voltages is within as close as possible to the sum of the same readings taken in Step 4.3.7.

4.6.5 Set the DS3 transmitter for DSX-MON, UNFRAMED, and a 1010 pattern. Select the signal analysis function, and configure it to read the DSX3-MON signal. Adjust S1 switches 5-8 until the sum of the plus and minus peak voltages is as close as possible to the readings taken in Step 4.3.9. Repeat Step 4.6.1 and check for proper operation.

4.6.6 Set the DS1 transmitter for UNFRAMED, 1010 pattern, AMI coding. Select the signal analysis function, and examine the DS1 signal. Adjust R177 until the sum of the plus and minus peak voltages is as close as possible to the readings taken in Step 4.3.6. Repeat Step 4.6.3 and check for proper operation.

4.6.7 Power off the unit and replace the Signal Analysis PWB in its slot. Ensure the unit under test is configured for back-to-back operation.

4.7 Front Panel Operational Check

4.7.1 Power the unit under test on and off 10 times, waiting approximately 2 -5 seconds between power on and off. Ensure there is no problem with screen roll or memory loss while performing this step. If no failures occur, check OK on the data record.

MAR 02 '94 04:53PM CTC BROADBAND TEST A P.9

4.8 Automatic Testing

4.8.1 Attach an RS-232 cable from the output of a personal computer to the RS-232 input of the unit under test. Using the standard ATE test programs for the AT9500, schedule the Bench and Error Insert tests. This will check for proper operation of the pattern detection, error detection, and signal analysis circuits. If no failures occur, check OK on the data record.

4.9 Factory Preset Insertion

4.9.1 After completion of step 4.8.1, schedule the Preset Load program on the computer, and execute this program. This will insert all normal factory presets. Make sure to insert the proper location when it is asked for.

5.0 External Clock Tests

5.0.1 If the unit under test does not have External Clock capability, proceed to section 5.1.

5.0.2 Ensure the unit under test is still configured for back to back operation. Connect the output of the signal generator to the External Clock input of the unit under test. Condition the generator output to be approximately 1V amplitude at a frequency of 44.736 MHz. From the DS3 Transmitter page of the front panel, select External Clock. Verify the DS3 section of the unit under test locks up. Start an untimed test, and verify the unit will run for a minimum of 2 minutes error free. Return to the DS3 Transmitter page and select internal clock.

5.0.3 Keeping the amplitude of the signal generator at 1V, change the frequency to 1.544 MHz. From the DS1 transmitter page, select External Clock. Verify the DS1 section of the unit under test locks up. Start an untimed test, and verify the unit will run for a minimum of 2 minutes error free. Return to the DS1 Transmitter page and select Internal Clock. Disconnect the signal generator from the unit under test.

5.1 Timed Tests

5.1.1 Ensure the unit under test is still in a back-to-back configuration. For DS3, configure the transmitter for FRAME M13, LEVEL LO, PATTERN BLUE. Configure the DS1 transmitter for FRAME SF, CODE AMI, PATTERN FIXED 3IN24. Ensure the unit under test will lock up on these patterns.

5.1.2 Start an untimed test. Select the DS1 STATUS and look for the presence of Yellow Alarm Seconds. If they occur, stop the test and reconfigure the DS1 transmitter for a pattern of 1010. Allow the unit under test to run for a minimum of 12 hours without stopping the test. Schedule the SUMMARY page on the front panel and observe as the unit is running that no errors or problems occur. It is permissible for this test to be unsupervised (i.e.,

P.10
MAR 02 '94 04:53PM CTC BROADBAND TEST A

run overnight). If the test completes without errors, check OK on the data record.

5.2 Sealing and Labelling

5.2.1 Apply "Cal Void" stickers to the appropriate places.

5.2.2 Apply the Calibration Label, noting the following:
1) Date Cal: Standard date when the unit was calibrated
2) Not Valid After: Standard calendar date after which the calibration of the unit is not valid. Determined by the latest cal cycle identified.
3) Tech: Signature or stamp of the calibrating technician.

5.2.3 This concludes the calibration and testing of the AT9500 Digital Transmission Analyzer. Ensure all applicable paperwork is given to the customer representative prior to departure.

P.11
MAR 02 '94 04:54PM CTC BROADBAND TEST A

SCIENTIFIC-ATLANTA, INC.
SERIES AT9500 DIGITAL TRANSMISSION ANALYZER
CALIBRATION DATA RECORD SHEET

		Tolerances	Initial	Final
4.1.4 Power Supplies			_____OK	_____OK
4.3.4 Transmitter Frequencies			_____OK	_____OK
4.3.6 DS1 Transmitted Signal				
Symmetry		-1.5 to 1.5 dB	_____	_____
Negative VP		-2.39 to -3.59 V	_____	_____
Positive VP		2.39 to 3.59 V	_____	_____
Negative Width	H	228 to 385 ns	_____	_____
	M	284 to 425 ns	_____	_____
	L	284 to 462 ns	_____	_____
Positive Width	H	228 to 385 ns	_____	_____
	M	284 to 425 ns	_____	_____
	L	284 to 462 ns	_____	_____
4.3.7 DS3 DSX Transmitted Signal				
Symmetry		-1.5 to 1.5 dB	_____	_____
Negative VP		-.36 to -.84 V	_____	_____
Positive VP		.36 to .84 V	_____	_____
Negative Width	H	5.0 to 10.5 ns	_____	_____
	M	7.6 to 15.8 ns	_____	_____
	L	10.1 to 28.0 ns	_____	_____
Positive Width	H	5.0 to 10.5 ns	_____	_____
	M	7.6 to 15.8 ns	_____	_____
	L	10.1 to 28.0 ns	_____	_____
4.3.8 DS3 HI Transmitted Signal				
Symmetry		-1.5 to 1.5 dB	_____	_____
Negative VP		-.60 to -1.37 V	_____	_____
Positive VP		.60 to 1.37 V	_____	_____
Negative Width	H	6.7 to 11.3 ns	_____	_____
	M	9.6 to 12.8 ns	_____	_____
	L	10.1 to 15.9 ns	_____	_____
Positive Width	H	6.7 to 11.3 ns	_____	_____
	M	9.6 to 12.8 ns	_____	_____
	L	10.1 to 15.9 ns	_____	_____
4.3.9 DS3 DSX-MON Transmitted Signal				
Symmetry		-1.5 to 1.5 dB	_____	_____
Negative VP		-.029 to -.097 V	_____	_____
Positive VP		.029 to .097 V	_____	_____
Negative Width	H	5.0 to 10.5 ns	_____	_____
	M	7.6 to 15.8 ns	_____	_____
	L	10.1 to 28.0 ns	_____	_____

MAR 02 '94 04:54PM CTC BROADBAND TEST A P.12

Positive Width	H	5.0 to 10.5 ns	_____	_____
	M	7.6 to 15.8 ns	_____	_____
	L	10.1 to 28.0 ns	_____	_____
4.5.7 DS3 HI Level Lockup			_____OK	_____OK
4.5.8 DS3 LO Level Lockup			_____OK	_____OK
4.6.2 DS3 Signal Analysis Values			_____OK	_____OK
4.6.3 DS1 Signal Analysis Values			_____OK	_____OK
4.7.1 Front Panel Operations			_____OK	_____OK
4.8.1 Automatic Testing			_____OK	_____OK
5.1.2 Timed Tests			_____OK	_____OK

SCIENTIFIC-ATLANTA FIELD SERVICE DIVISION
VERIFICATION/CALIBRATION RECORD

Date:

Customer's Name:
Location:
Equipment Name:
Model Number:

Unit I.D. Number:
Dept.:
Mfgr.:
Serial Number:

This instrument has been calibrated in terms of the standards maintained by this repair/calibration facility, which are traceable to the National Institute of Standards and Technology and was found to be within specification(s) by:

_____Manufacturer's Specifications Other: _____

Supporting documentqation relative to traceability is on file at this facility, and is available for examination upon request.

Calibration Information

Interval: 30 60 90 180 365 days (Circle One)

Procedure Number:
Temperature:
Calibration Date:
Calibrating Personnel:

Compliance:
Relative Humidity:
Next Calibration Due Date:

_____ (Print) _____(Signature)

Reason for Service:

_____Calibration Due _____Inoperative _____Other(Describe Below)

Condition Found:
_____Operative/Meets Specifications _____Inoperative _____Damaged

For MIL-STD 45662A Use Only:
The collective uncertainty of the measurement process shall not exceed 25 percent of the acceptable tolerance allowed for any individual characteristic measured, unless otherwise noted.

Calibration Equipment List:
The following Scientific-Atlanta standards were used in performing the instrument calibration.

Model:	Mfg:	Serial/Asset No:	Cal Due:
Model:	Mfg:	Serial/Asset No:	Cal Due:
Model:	Mfg:	Serial/Asset No:	Cal Due:
Model:	Mfg:	Serial/Asset No:	Cal Due:

MAR 02 '94 04:55PM CTC BROADBAND TEST A P.14

CHAPTER 3
MAINTENANCE

3.1 INTRODUCTION

The AT 9500 is durable and reliable and requires no preventive maintenance other than cleaning air filters occasionally. However, once a year the analyzer should be inspected and calibrated by a representative of Scientific-Atlanta. Look on the last page of this section for the address and telephone number of the Scientific-Atlanta service center nearest you.

This section tells you how to find defective printed circuit cards. Some cards can be repaired but cards or components beyond repair must be replaced with identical new ones from Scientific-Atlanta. Ordering information is in Chapter 4.

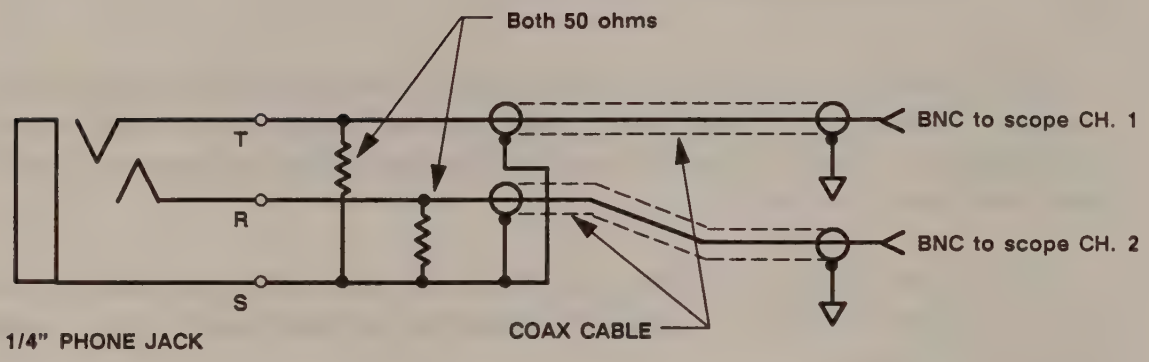
Before you start repairing a defective card, read the theory of operation on that card in Chapter 2, and review the schematic of that card in Chapter 5.

This chapter starts with the basic steps to follow when the AT 9500 is not working. You will start by looking for the most general problems and working toward the most specific problems.

You'll need, as a minimum, this equipment:

- A Digital Volt Meter (DVM)
- A dual-trace oscilloscope, Tektronix Model 2645 Oscilloscope or equivalent with at least two 300 MHz passive probes
- A FET probe, Tektronix Model P6201 or equivalent
- Frequency Counter, Hewlett-Packard, Model HP5316A, or equivalent
- Scientific-Atlanta Card Extender, Number 327934
- Scientific-Atlanta AN31 Waveform Test Set

Be sure this test equipment is calibrated and working properly. You'll also need a 75-ohm BNC feed-through terminator, twisted-pair cables and coaxial cables, and a 100-ohm differential terminator. You can easily make the differential terminator. Here's a sketch.



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3.2 EXTERNAL TROUBLESHOOTING

This section tells you how to start troubleshooting before taking the cover off the analyzer. Figure 3.1 is a flow chart showing you the sequence of isolating the problem.

NOTE

You may not have to follow the chart from top to bottom. The indications of failure you notice will determine where in the chart you will start.

Figure 3.1 assumes the analyzer is sitting on the bench and all you know is that "something" is wrong.

However, before you begin...

WARNING

THIS ANALYZER USES DANGEROUS VOLTAGE. FOLLOW THESE PRECAUTIONS BEFORE TURNING ON THE POWER TO KEEP FROM HURTING OR KILLING YOURSELF.

- **ANY REPAIR OR ADJUSTMENT MADE TO THE ANALYZER WITH THE POWER ON SHOULD BE DONE ONLY BY EXPERIENCED TECHNICIANS WHO KNOW THE HAZARDS OF HIGH VOLTAGE.**

- **USE ONLY A THREE-PRONGED POWER CORD TO CONNECT THE ANALYZER TO AC POWER.**

- **WHEN USING AN AUTO-TRANSFORMER, MAKE SURE THE COMMON TERMINAL IS CONNECTED TO THE NEUTRAL POLE OF THE POWER SOURCE.**

- **THE SOCKET OF THE POWER CORD, AND OF ANY EXTENSION CORD, MUST HAVE A PROTECTIVE EARTH GROUND.**

- **WHEN THESE PROCEDURES REQUIRE TAKING OFF THE PROTECTIVE COVER, BE CAREFUL. EVEN IF THE ANALYZER IS UNPLUGGED FROM AC POWER, CAPACITORS ON THE POWER SUPPLY CAN STILL HAVE DANGEROUS VOLTAGE ON THEM.**

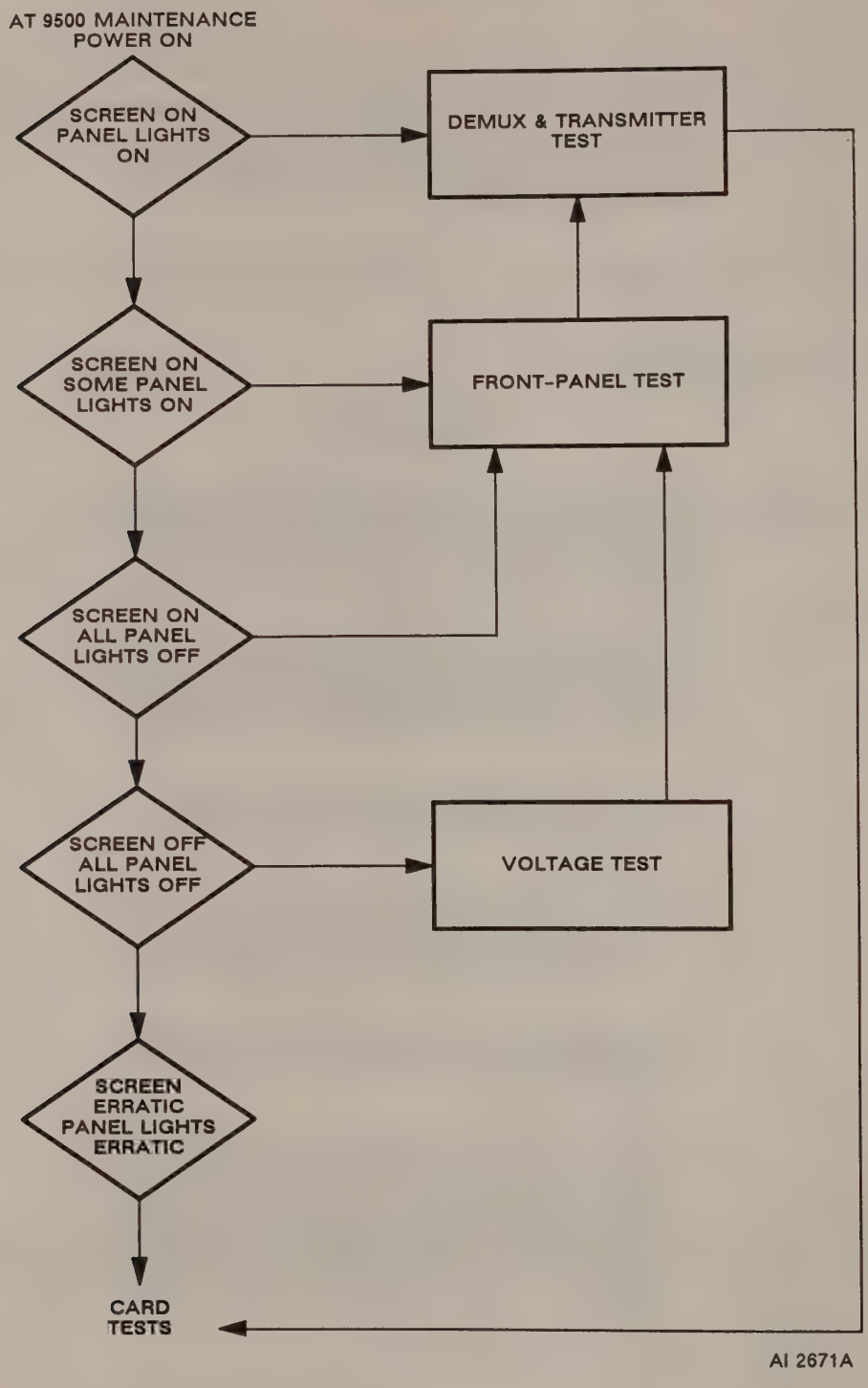


Figure 3.1. Troubleshooting Flowchart

First thing, check your power sources.

Using the ac source. Check that the analyzer is plugged in properly. If the source is controlled by a switch make sure the switch is on. Check the source voltage at the analyzer's chassis connector and check the fuses.

Using the dc source. Check dc source connections for proper polarity. Check the fuses.

Turn on the analyzer.

Screen does not light. Go to Section 3.3, Internal Troubleshooting.

The front-panel POWER switch shows a green dot; the sign-on screen appears, followed by a summary screen, see Figures 3.2 and 3.3.

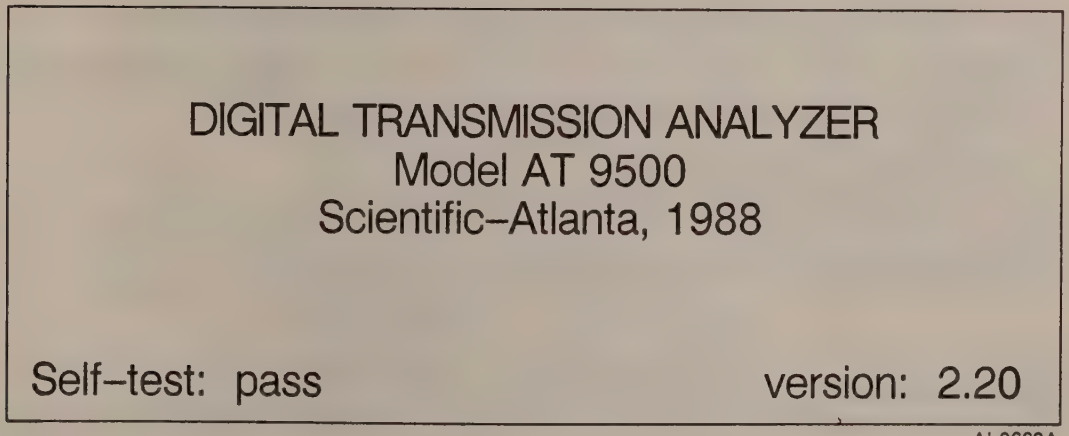


Figure 3.2. Typical Sign-on Screen

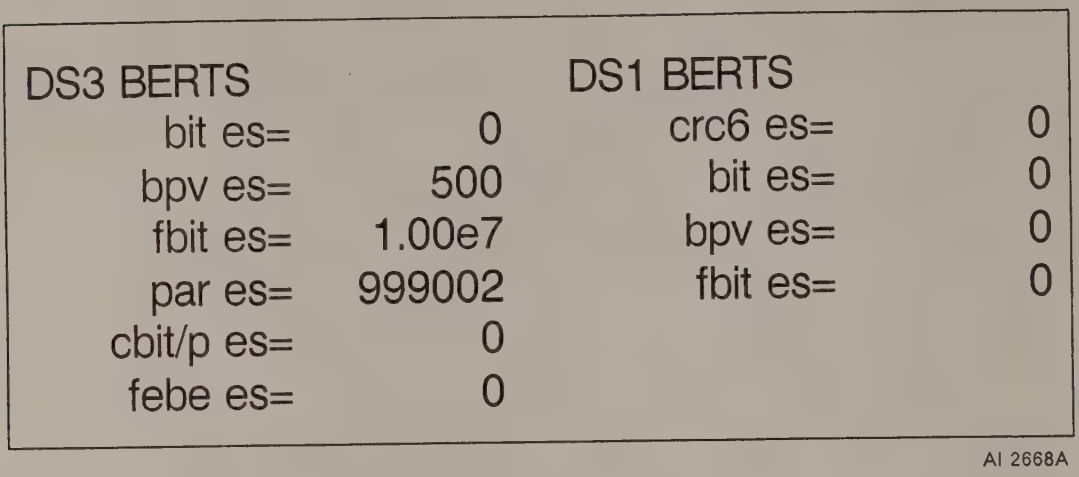


Figure 3.3. Typical Summary Screen

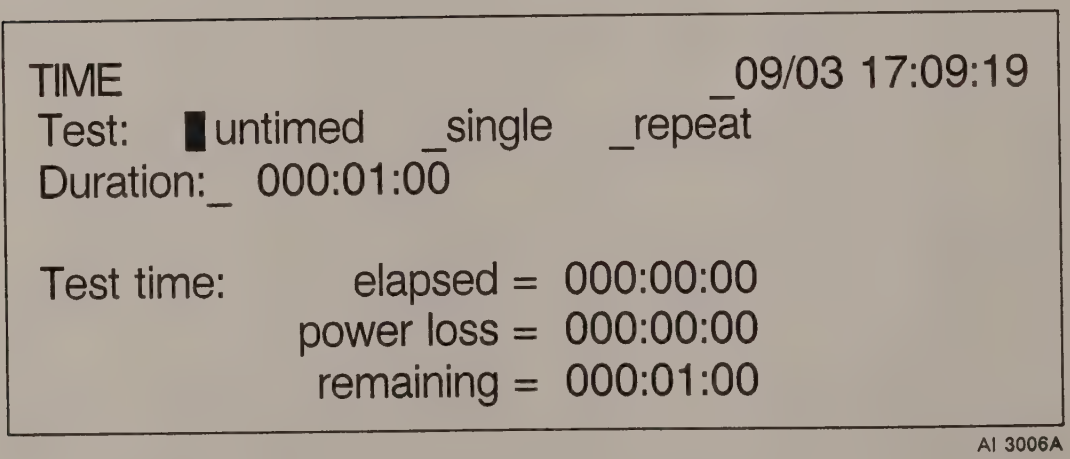


Figure 3.4. Typical TIME Screen

Sign-on screen appears, summary screen does not, and screen shows "RECEIVER CHANNELS NOT INSTALLED." If demux (receiver) card is installed, you may have a problem with the demux bus interface. Go to Section 3.3.3.

Sign-on screen appears, but summary screen does not. On the front of the analyzer, on the TEST panel, push TIME. LED in the TIME switch lights, and TIME screen appears, see Figure 3.4. Readout in upper right of TIME screen gives date and time. Check that clock is running.

Clock isn't running. Check clock on real-time clock card, Section 3.3.5, **Step One.**

Clock is running. Push TIME switch off and then on, and check that clock doesn't reset to zero.

Clock resets to zero and is running. Check real-time clock card battery, Section 3.3.5, **Step One.**

NOTE

The AT 9500 Analyzer will work without a fully charged battery. However, each time you turn it on, you'll have to reset the clock. Also, the historical data will not be saved.

Sign-on screen and summary screen appear. All front-panel LEDs light simultaneously for about 1 second. The red, current status LEDs for LOS, OOF and PATT LOSS on the STATUS panel stay on. The SUMMARY switch LED will come on when the summary screen appears.

On the LEVEL panel, the DSX or (depending on how the analyzer was previously set up) the PROG green LED will light. On the TEST panel, either the RUN or STOP red light will light. (If the RUN LED is on, the PWR LOSS LED will also be on.) If the RUN LED is on, push the RUN STOP button to stop the test transmitter.

Lights look normal. Go to Section 3.3.2 for transmitter card tests and Section 3.3.3 for the demux card tests.

Lights don't look normal. On the RESULTS panel, in sequence, left-to-right, under -MEASUREMENTS- push SUMMARY, DS3 DS1, and AUX. Under STATUS, push DS3 DS1. On the SET UP panel, bottom-to-top, push SYSTEM, XMTR, DEMUX, and RCVR/THRU switches.

LEDs in these switches light. The central processing unit, real-time clock and mothercard are OK. Check transmitter card, Section 3.3.2.

OOF or PATT LOSS do not light. Check the demux card, Section 3.3.3.

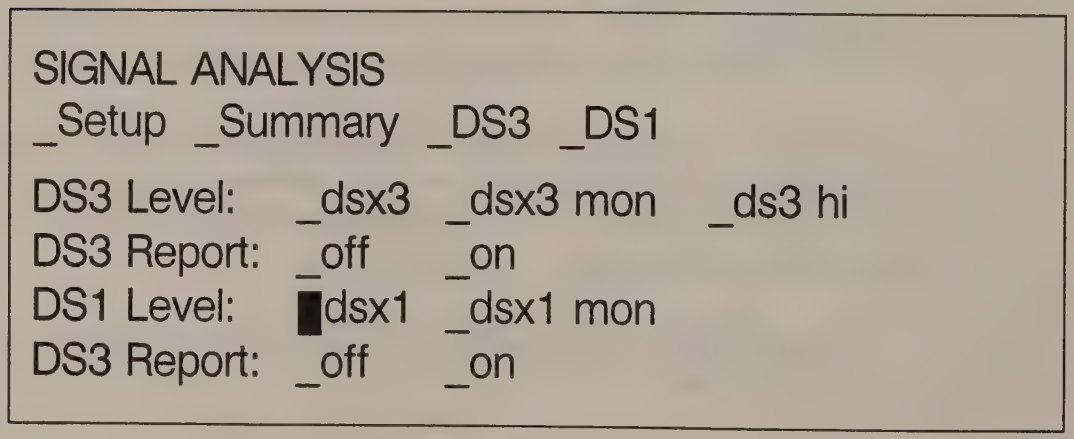
LOS lights, OOF or PATT LOSS do not light. Run diagnostic test, Section 3.3.5, to check the front panel and front-panel interface card.

No front-panel LEDs light, or front-panel lights flicker. Run diagnostic test to check the front panel and front-panel interface card, CPU and real-time clock.

On the front connector panel, use a twisted-pair cable to connect DS1 receiver (RX) to DS1 transmitter (TX). Use a coaxial cable to connect DS3 receiver (RX) to DS3 transmitter (TX).

DS3 and DS1 LOS lights go out. Demultiplexer card and transmitter card are OK. Run diagnostic test, Section 3.3.5.

DS1 LOS light stays on. First, check the signal analysis card. On the front panel of the analyzer, on the RESULTS panel, choose AUX. Screen will show Signal Analysis Setup Figure 3.5.



AI 3007A

Figure 3.5. SIGNAL ANALYSIS Setup Screen

Use the arrow keys and move cursor to "__Setup" and push ENTER. Then move cursor to "DS1 Level" line at "__dsx1." Push ENTER, then EXIT, then Summary. Screen will show Signal Analysis Summary, similar to Figure 3.6.

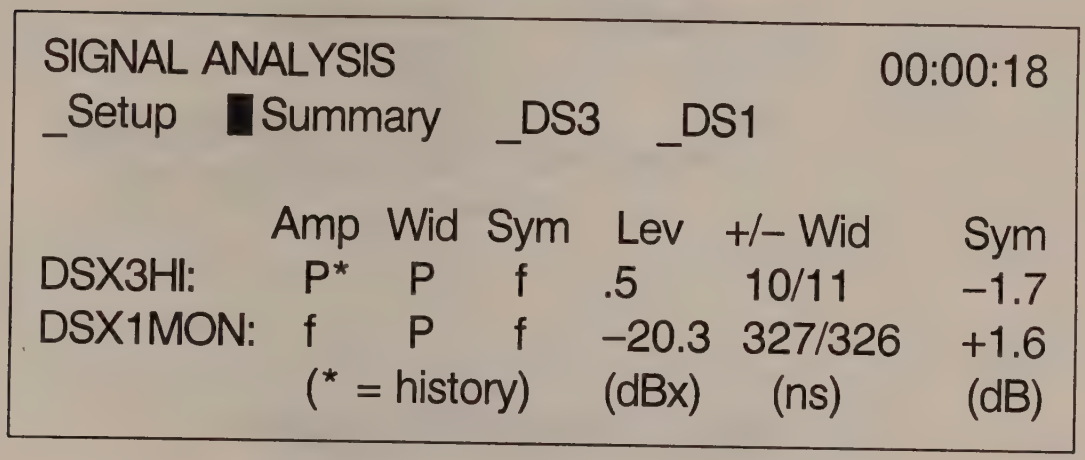


Figure 3.6. Typical SIGNAL ANALYSIS Summary Screen

On "DSX1MON" line, "Amp", "Wid" and "Sym" all show "P" (pass). Transmitter card is OK. Proceed to Section 3.3.4.

On "DSX1MON" line, there is "f" (fail) under "Amp." Transmitter card, or signal analysis card, or both, are bad. Check transmitter card first, Section 3.3.2 and then signal analysis card, Section 3.3.4.

Take cable out of DS1 RX and check TX output with oscilloscope. Connect the two lines from the 100-ohm differential terminator to CH.1 and CH.2 on the oscilloscope. Set the oscilloscope to INVERT CH.2 and add CH.1 and CH.2. Set both channels to 1 V/div. Compare bipolar signal on oscilloscope with template, see Figure 3.7. With oscilloscope set for 200 nanoseconds/division, oscilloscope pulse must fit in shaded area of template pulse to be acceptable.

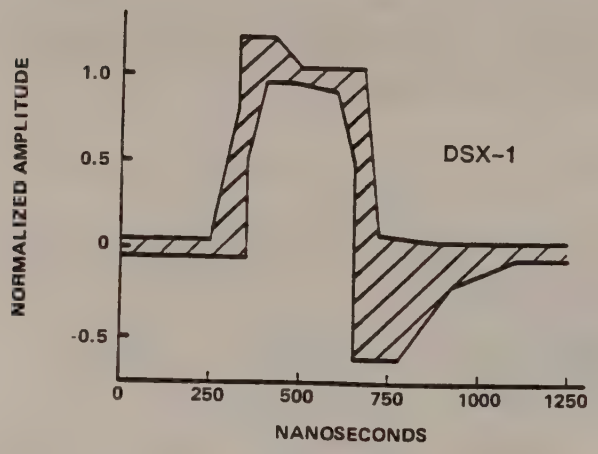


Figure 3.7. DS1 Transmitter Output Signal

Bipolar signal is correct, but screen still shows "f." Connect known, correct DS1 source to DS1 RX on front panel, then recheck for "f."

No bipolar signal, or an unacceptable bipolar signal. Transmitter card is bad. Go to Section 3.3.2.

Correct bipolar signal. Transmitter card is good. First, check signal analysis card, Section 3.3.4, and then check demux card, Section 3.3.3.

DS1 LOS light stays on. Take cable out of DS1 RX and check TX output with oscilloscope. Compare bipolar signal with template, see Figure 3.7.

> No bipolar signal, or an unacceptable bipolar signal. Transmitter card is bad. Go to Section 3.3.2
>
> Correct bipolar signal. Transmitter card is good. Check demux card, Section 3.3.3.

Both the DS1 and DS3 LOS lights stay on. Check bus interface section of transmitter card, Section 3.3.2.3. Re-insert cable into DS1 or DS3 RX.

PATT LOSS and OOF LEDs, either or both DS3 and DS1, are off. On the front of the analyzer, on the SET UP panel, push XMTR. You will see a SELECT XMTR screen, see Figure 3.8.

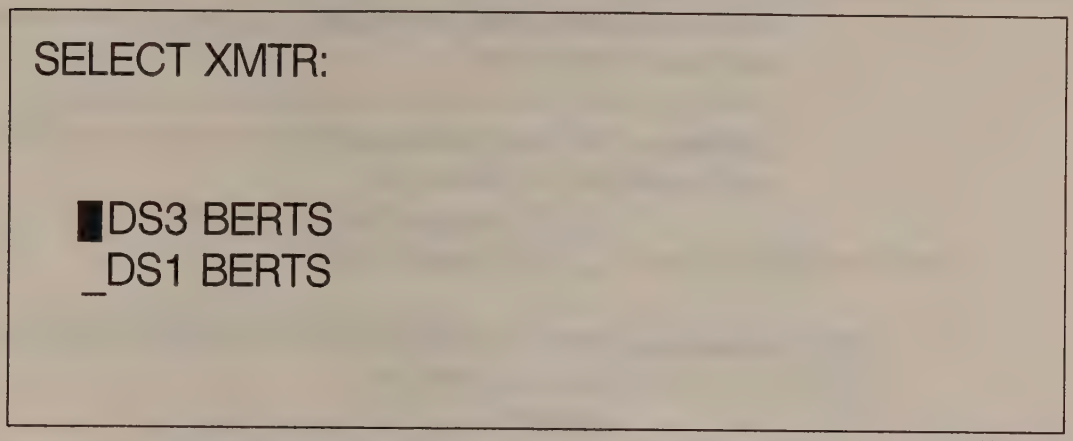


Figure 3.8. SELECT XMTR Screen

DS3 PATT and OOF lights are off. Choose __DS3 BERTS and press ENTER. Screen shows DS3 BERTS XMTR SETUP, see Figure 3.9.

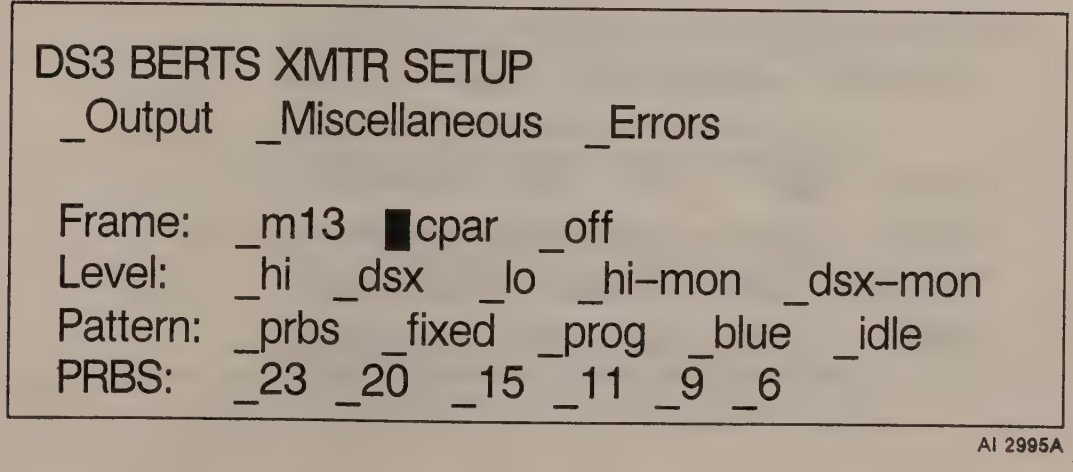


Figure 3.9. DS3 BERTS XMTR SETUP Screen

Cursor on "Frame:" line at either "m13" or "cpar." Framing is on.

Cursor on "Frame:" line is at "off." Move cursor with arrow key to "__m13" and push ENTER.

PATT LOSS comes on, then OOF and PATT LOSS go off. Demultiplexer card and transmitter card are OK.

OOF stays on. First, check transmitter card, Section 3.3.2; if that doesn't help, then check demultiplexer card, Section 3.3.3.

Move cursor with arrow keys to "__off" and push ENTER.

PATT LOSS goes out. Trouble could be in either card. Check transmitter card first, Section 3.3.2, and then demultiplexer card, Section 3.3.3.

DS1 PATT LOSS and OFF lights are off. Push EXIT to get SELECT XMTR screen, choose __DS1 BERTS and push ENTER. Screen shows DS1 BERTS XMTR SETUP screen, see Figure 3.10.

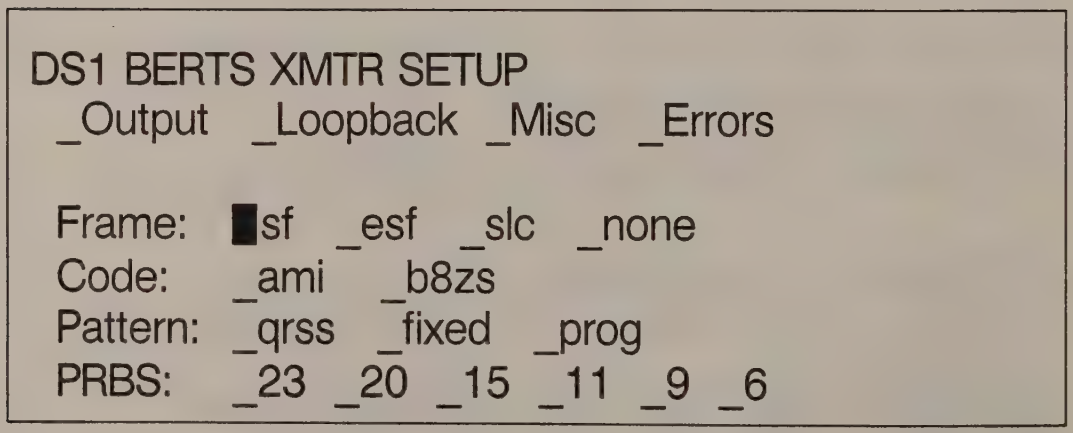


Figure 3.10. DS1 BERTS XMTR SETUP Screen

Cursor on "FRAME:" line at either "sf," "esf," or "slc" means the framing is on. If cursor is at "none", move cursor to "___sf", and push ENTER.

PATT LOSS comes on, then OOF and PATT LOSS go off. Demultiplexer card and transmitter card are OK.

Now you are ready for INTERNAL TROUBLESHOOTING, Section 3.3.

3.3 INTERNAL TROUBLESHOOTING

Before you take the cover off the analyzer...

WARNING

THIS ANALYZER REQUIRES DANGEROUS VOLTAGE. FOLLOW THESE PRECAUTIONS BEFORE TURNING ON THE POWER TO KEEP FROM HURTING OR KILLING YOURSELF.

- **ANY REPAIR OR ADJUSTMENT MADE TO THE ANALYZER WITH THE POWER ON, SHOULD BE DONE ONLY BY EXPERIENCED TECHNICIANS WHO KNOW THE HAZARDS OF HIGH VOLTAGE.**
- **USE ONLY A THREE-PRONGED POWER CORD TO CONNECT THE ANALYZER TO AC POWER.**
- **WHEN USING AN AUTO-TRANSFORMER, MAKE SURE THE COMMON TERMINAL IS CONNECTED TO THE NEUTRAL POLE OF THE POWER SOURCE.**
- **THE SOCKET OF THE POWER CORD, AND OF ANY EXTENSION CORD, MUST HAVE A PROTECTIVE EARTH GROUND.**
- **WHEN THESE PROCEDURES REQUIRE TAKING OFF THE PROTECTIVE COVER, BE ESPECIALLY CAREFUL. PAY ATTENTION. BE CAREFUL.**
- **EVEN IF THE ANALYZER IS UNPLUGGED FROM AC POWER, CAPACITORS ON THE POWER SUPPLY CAN STILL HAVE DANGEROUS POWER ON THEM.**

3.3.1 How to Find Bad Cards Quickly

NOTE

After you have isolated the problem to a particular printed circuit card, make sure the card is completely repaired and checked before you put it back in the analyzer.

CAUTION

Turn off the power before you remove or install a printed circuit card, every time, or the card may be damaged.

1. With power off, remove four screws that hold to top of the analyzer and take the top off, see Figure 3.11.

2. Look for the obvious: Broken runs on printed circuit cards, coaxial cables, flat cables and panel connections. Card components that are discolored, bulging, burned, scorched and disconnected. Take care of these obvious problems before you start looking for less obvious ones.

3. Turn on the analyzer.

   LCD screen, nor front panel LEDs do not light. Check two amber power lights on the mothercard, see Figure 3.12.

   Power Supply LEDs are not on. Replace power supply. Here's how you do that.

   (1) Turn off power.
   (2) Remove real-time clock card, and CPU card, see Figure 3.13.
   (3) On rear panel of analyzer, remove four screws holding power supply to rear of analyzer, see Figure 3.14. Power supply cover will come off.
   (4) On the bottom of the power supply card are three cables, see Figure 3.14. Unsnap connectors and remove mothercard cable and ac power cable.
   (5) Disconnect fan cable and remove power supply.
   (6) Install replacement power supply.

   Power Supply LEDs are on. Run diagnostic test, Section 3.3.5.

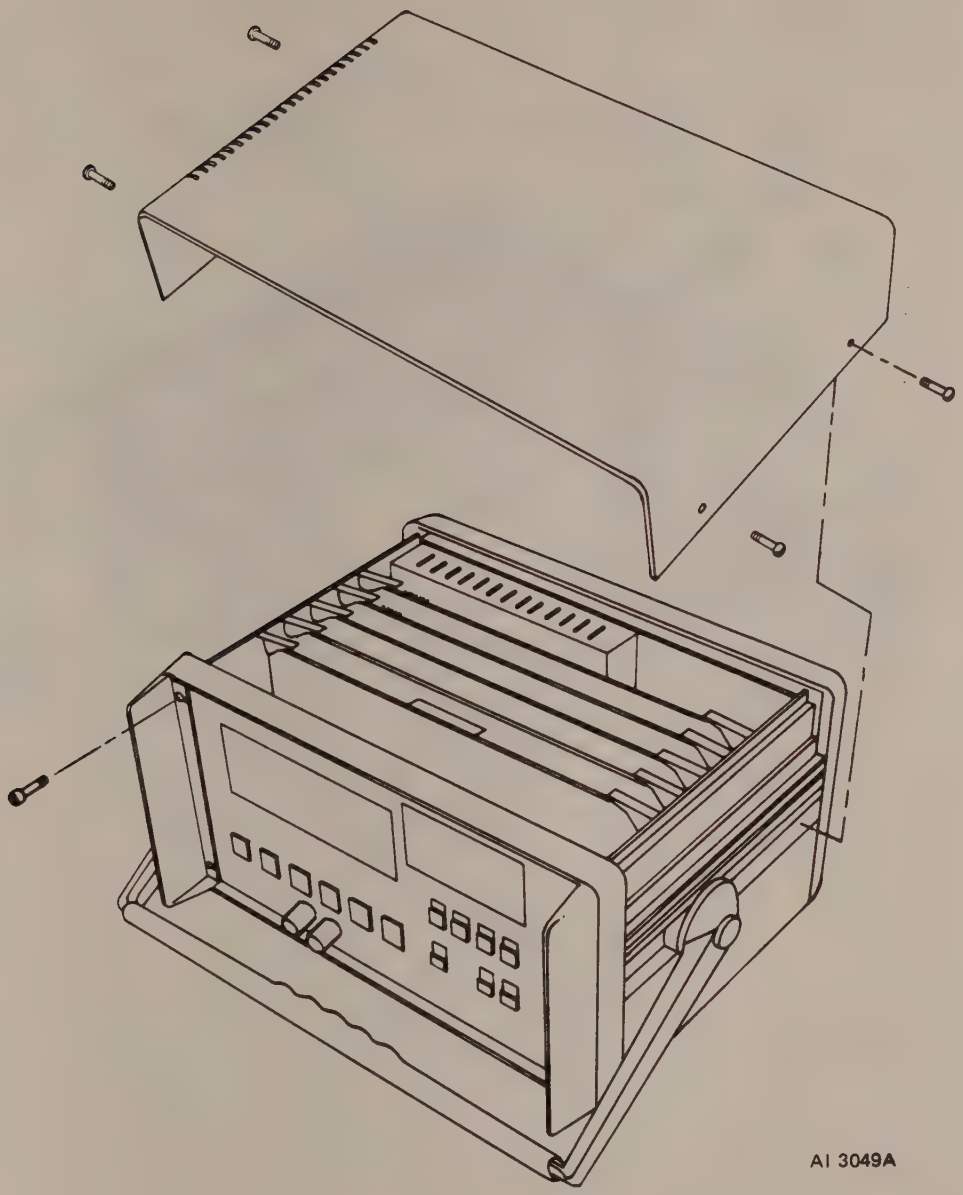


Figure 3.11. Removing Analyzer Top

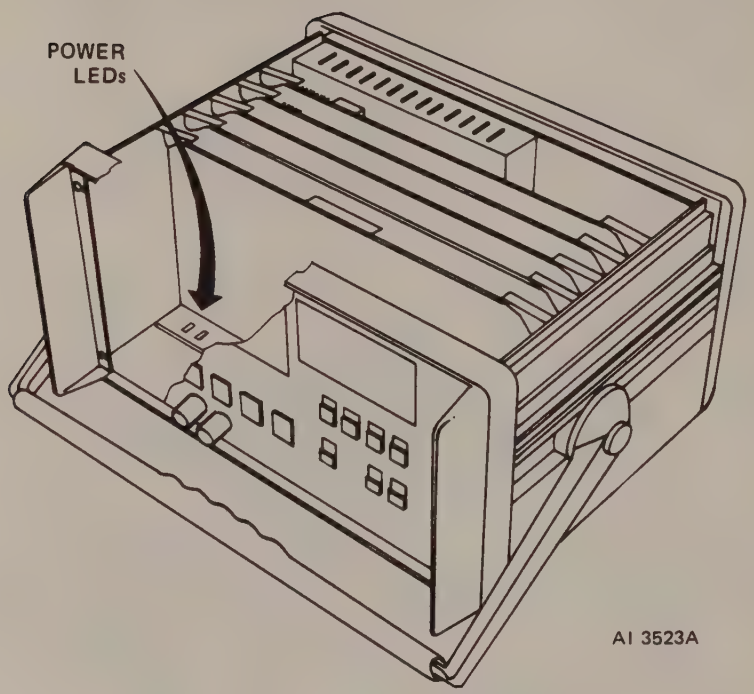


Figure 3.12. Power Supply LEDs

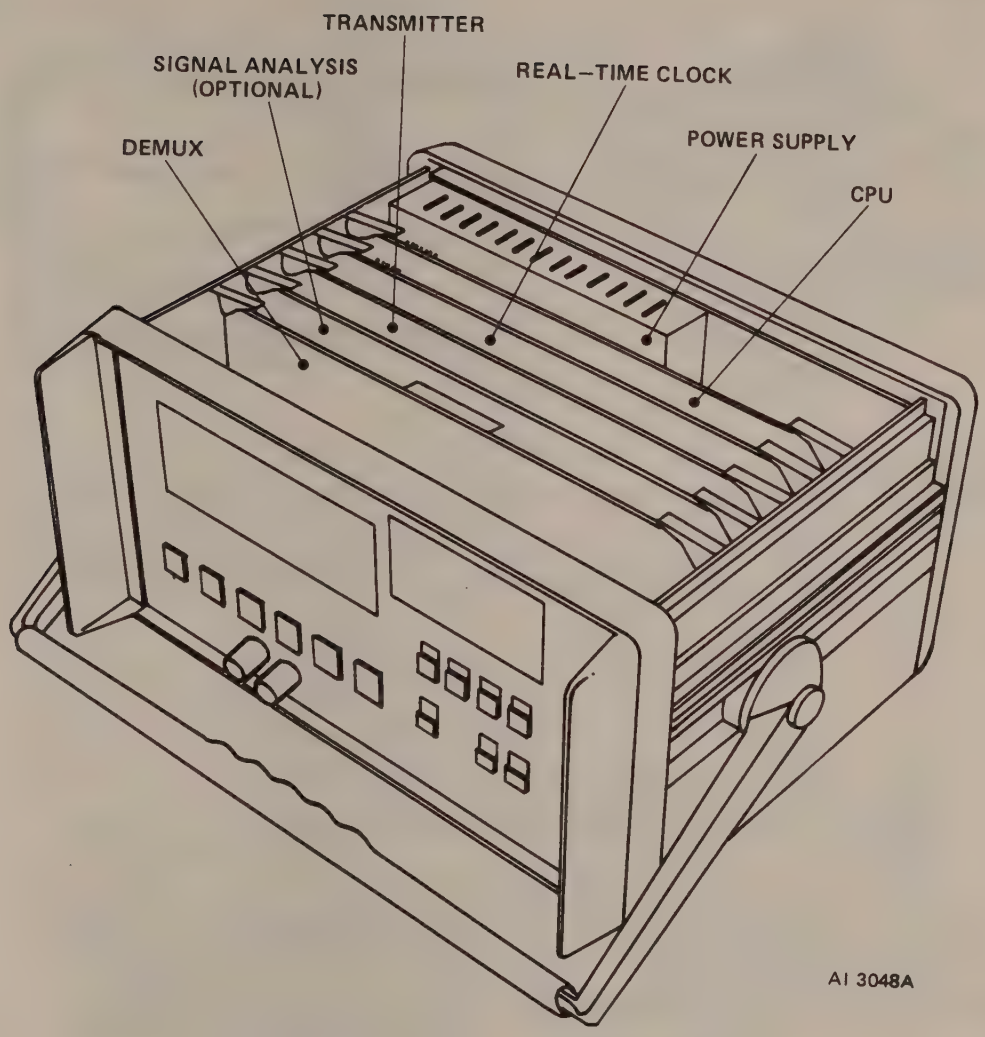


Figure 3.13. Card Location

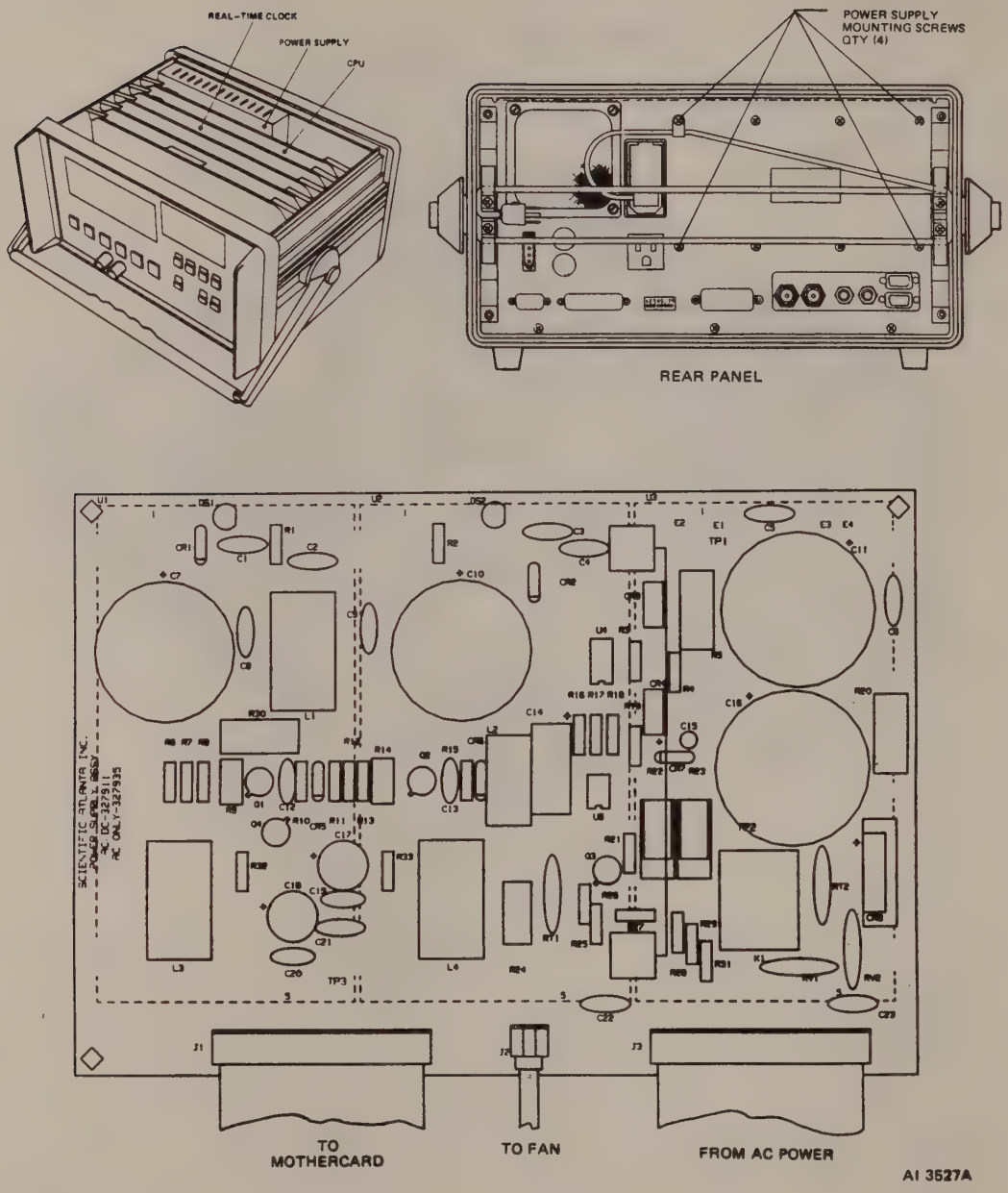


Figure 3.14. Removing Power Supply

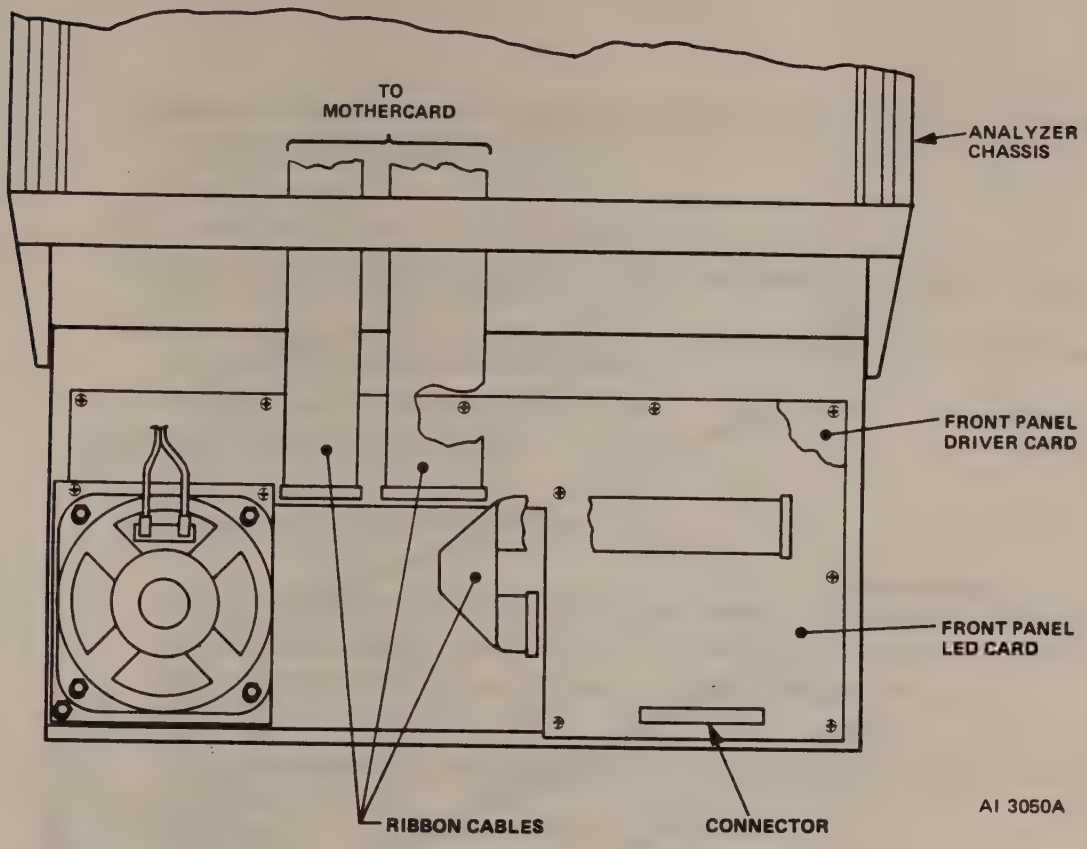


Figure 3.15. Front-panel Cables

LCD screen and front-panel LEDs light. Remove transmitter card, see Figure 3.13 and front-panel card. Remove the front of the analyzer, see Figure 3.11, and disconnect the ribbon cables between the front-panel card and the mothercard, see Figure 3.15. Leave the demux card, central processing unit card, and the real-time clock card.

Put the demux card, Figure 3.16, on Scientific-Atlanta card extender, Number 327934.

1. Turn on the analyzer.

   Check supply voltages at points shown in Figure 3.16. On demux PWB J2 C-2, +5 volts ±0.25 volts. On demux PWB J2 C2-30, -5.2 volts ±0.25 volts.

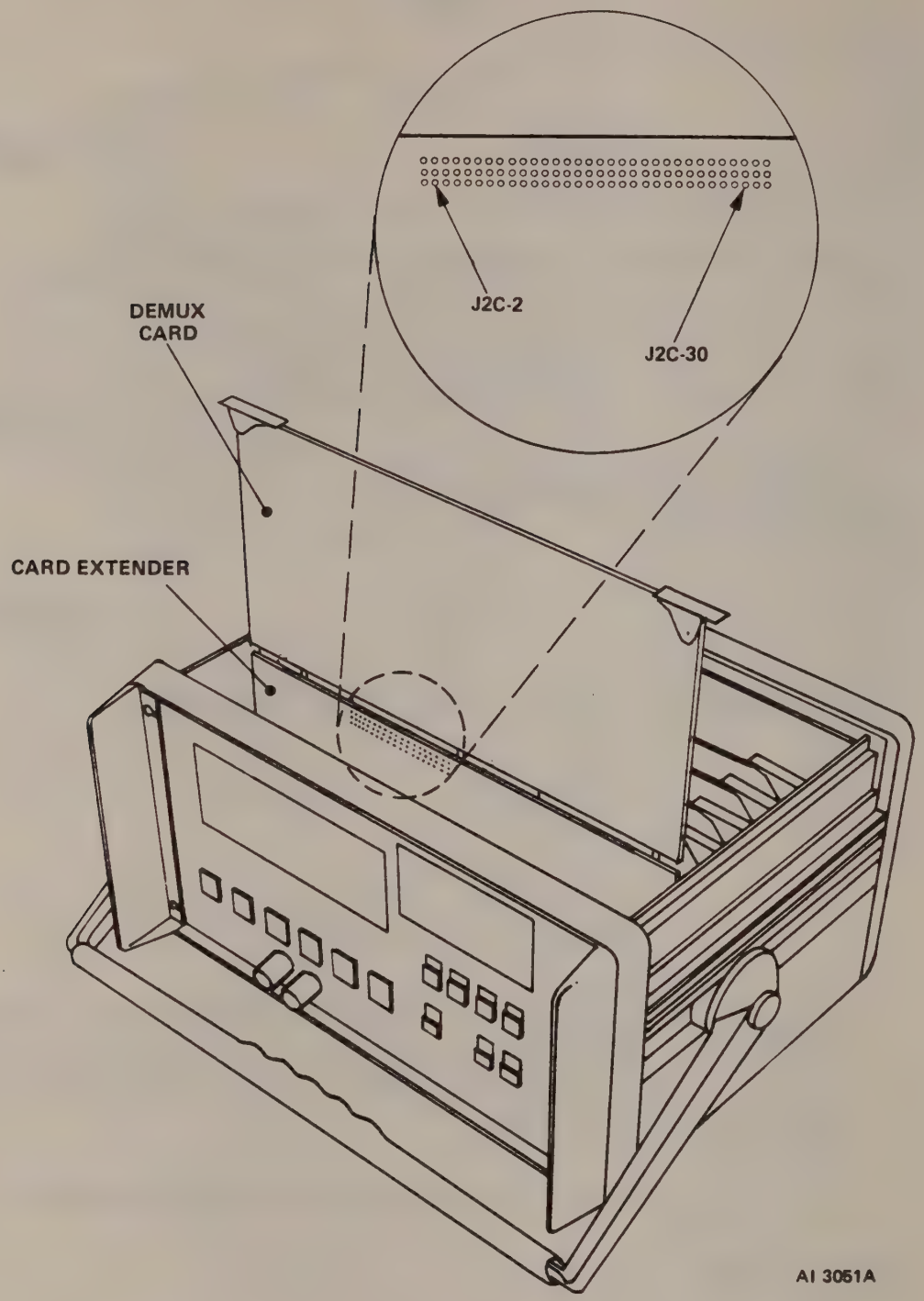


Figure 3.16. Supply Voltage Checkpoints

Voltage missing or voltage out of tolerance. Replace power supply. Here's how you do that.

(1) Turn off power.

(2) Remove real-time clock card, and CPU card, see Figure 3.14.

(3) On rear panel of analyzer, remove four screws holding power supply to rear of analyzer, see Figure 3.14. Power supply cover will come off.

(4) On the bottom of the power supply card are three cables, see Figure 3.14. Unsnap connector and remove mothercard cable and ac power cable.

(5) Disconnect fan cable and remove power supply.

(6) Install replacement power supply.

Voltages correct. Run diagnostic test, Section 3.3.5.

Sign-on screen appears, the front-panel LEDs light properly, then screen shows "RECEIVER CHANNELS NOT INSTALLED" The CPU card, real-time clock card and mothercard are OK but the CPU doesn't recognize the demux. Check demux card, Section 3.3.3.

Sign-on screen appears, summary screen does not. On front of analyzer, on the SETUP panel, push XMTR.

Screen shows "TRANSMITTER CHANNELS NOT INSTALLED." If transmitter card is installed, check transmitter bus interface, Section 3.3.2.3. If not, on front of analzyer, on the RESULTS panel, push AUX.

Screen shows AUX CARDS NOT INSTALLED. If optional signal analysis card is installed, go to Section 3.3.4.

No sign-on screen, but front-panel LEDs light. The mothercard, the CPU card and the real-time clock card are OK. Check the LCD module and cable, and the front-panel and front panel driver cards, with diagnostic test, Section 3.3.5

2. Plug in the transmitter card and demultiplexer card, in sequence. If LCD screen goes out when you install either card, then that card is bad. See Section 3.3.2 for transmitter card and Section 3.3.3 for demultiplexer card.

3.3.2 Transmitter Card

Several steps in the external troubleshooting procedure point you toward the transmitter card, but all the indications mean the same thing: No bipolar signal or an unacceptable bipolar signal at either DS1 or DS3 outputs, or on both.

NOTE

Some integrated circuits on the transmitter card are programmed and can only be replaced by Scientific-Atlanta. They are all in the Parts List, Chapter 4, but for your convenience, they're listed here too.

Reference Designator	Scientific-Atlanta Part Number
U14	A457022
U13	A328017
U20	A328019
U22	A328021
U1	A327878
U2	A327877
U3	A327876
U6	A328778
U7	A327875
U8	A327876
U4	A327877
U11	A327876
U19	A457016 (Set)
U18	A309148
U25	A309149
U27	A309625
U4	A327878
U5	A327877
U6	A327876
U12	A327878
U13	A327877
U14	A327876
Z1	A327940
Z2	A327942
Z3	A327944
U1	A327878
U8	A327876

Several voltage and oscilloscope readings you'll be making will vary, depending on the data pattern you have selected. Which data pattern you choose isn't critical; however, to keep your readings consistent, once you choose a pattern, don't change it.

Here's the procedure for troubleshooting the DS1 circuit of the transmitter card.

3.3.2.1 No DS1 Signal Out

Have the transmitter card schematic handy (Chapter 5) and refer to Figure 3.17 to locate card components.

Disconnect from transmitter card, DS1 cable from J14, see Figure 3.18, disconnect DS3 cables from J11, J12 and J13 and disconnect external clock cables from J22 and J23. Put the transmitter card on the Scientific-Atlanta card extender.

Step One: Checking clock oscillator U8.

1. Use oscilloscope to check for 6.176 MHz clock pulse, TTL level, at output of crystal oscillator U8, pins 4 and 8. (Square pin is pin 1, number pins counterclockwise.)

   Clock pulse is correct. Oscillator is OK but something else is wrong. Check U14, **Step Two.**

   No clock pulse at pins 4 and 8 of U8. Check input pin 14 for +5 volts dc. If you have +5 volts in and no clock pulse out, replace oscillator U8 and check output of replacement U8 for clock pulse.

      Clock pulse is correct. Reconnect J14. Check transmitter card output for a DS1 bipolar signal, Figure 3.17, that meets template specifications.

         Transmitter output meets specifications. Good. The oscillator was the problem. Remove card extender, reconnect cables to J11, J12, J13, J14, J22 and J23, plug transmitter card back into analyzer, replace card retainers and replace analyzer top. Turn on the analyzer and repeat procedures in Section 3.2 that apply to this card.

         Transmitter output does not meet specifications. You have more than oscillator problems. Go to **Step Two.**

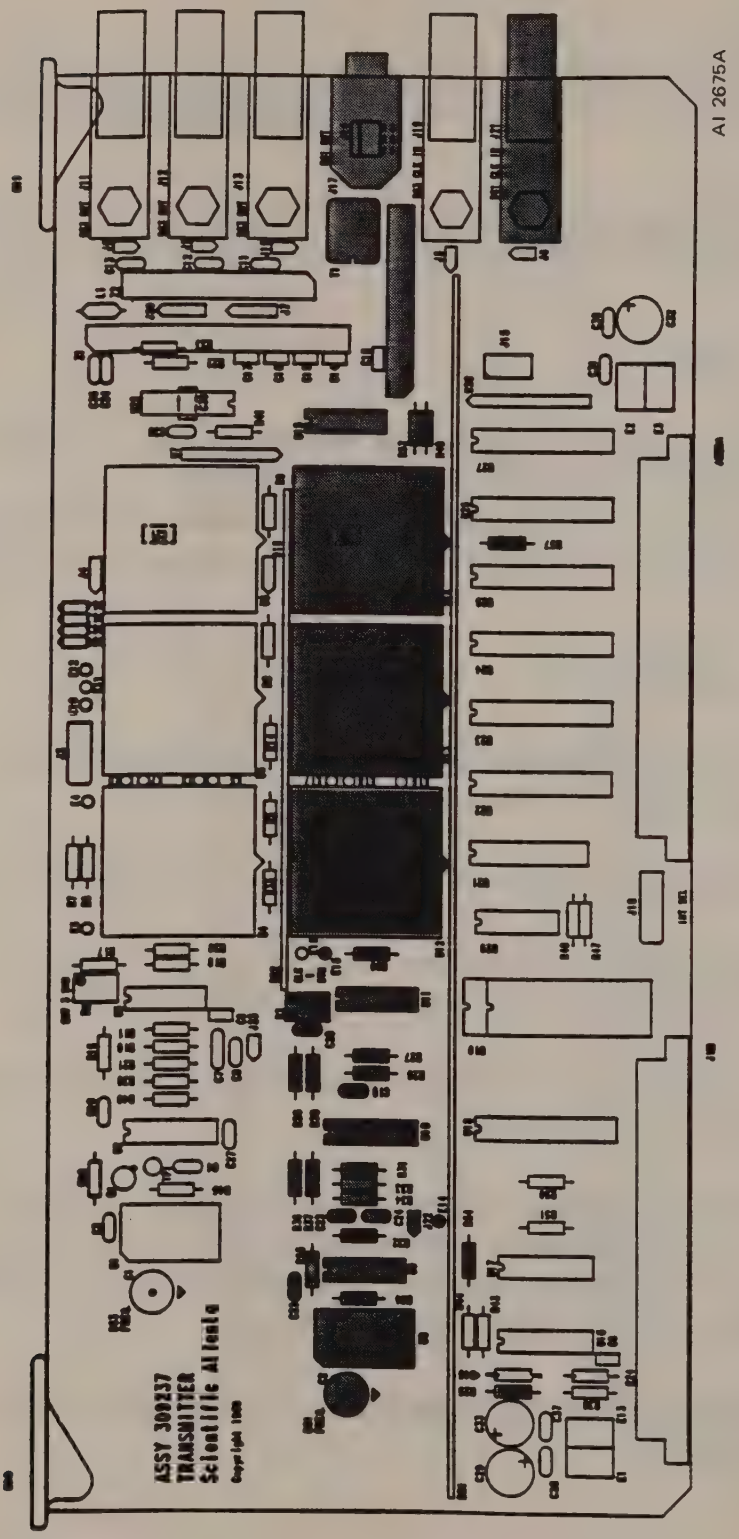
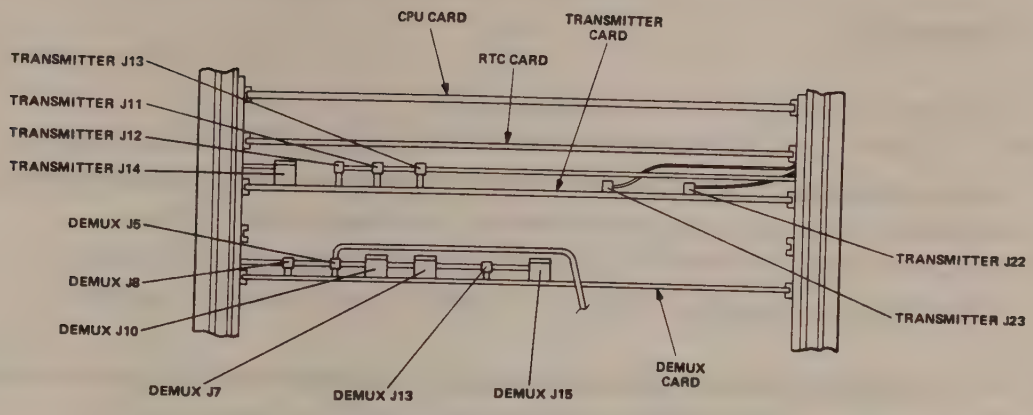


Figure 3.17. DS1 Components of Transmitter Card



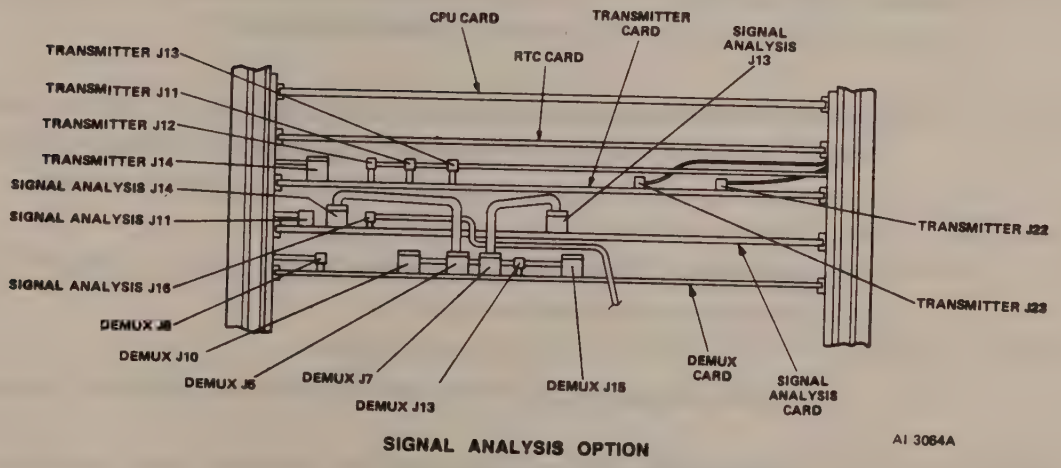


Figure 3.18. Analyzer Connection Cables

Step Two: Check U14.

1. Reconnect J14.

2. Check input of U14, pin 28 for 1.544 MHz clock pulse.

Correct clock pulse at pin 28 of U14. All components from the output of oscillator U8 to pin 28 of U14 are good but the transmitter card output is still bad. Check amplifier Z3, **Step Three.**

No clock pulse at pin 28 of U14. Check for 1.544 MHz clock pulse at pin 6 of chip U11.

Clock pulse is there, but not at pin 28 of U14. Check for open circuit between the two pins.

No clock pulse at pin 6 of U11. Check for clock pulse at pin 6 of U10.

Clock pulse at pin 6 of U10. With your oscilloscope measuring the clock pulse at pin 6 of U11, adjust R3 until you get a clock pulse with a 50/50 duty cycle, see Figure 3.17.

You can adjust R3 and get a 1.544 MHz clock pulse at pin 6 of U11. Reconnect cables and check transmitter card output, see Figure 3.7. If output pulse fits within specified template, reassemble analyzer and repeat procedures in Section 3.2 that apply to this card.

You cannot adjust R3 for a 1.544 MHz clock pulse at pin 6 of U11. Replace U11, then check output of transmitter card, see Figure 3.7.

Transmitter output correct. Reassemble analyzer and repeat procedures in Section 3.2.

Transmitter output not correct. Check input of pin 28 of U14 for 1.544 MHz clock pulse.

Clock pulse present at pin 28 of U14. Check U14, U13 and U12, see **Step Four.**

U14 input still not correct.

3. Let's review. Oscillator U8 is good, chip U11 is good. But your transmitter output is not right, and your input to U14 is not right, and you have no output at pin 6 of U10.

4. Check output from U10, pin 6.

No output from U10. Check the three selector lines on the input of U10, pins 9, 10 and 11 for logic zero (< +0.4 volts).

Logic high (> +0.4 volts) at pins 9, 10 or 11 of U10. Check DS1 BERTS XMTR SETUP. Here's how you do that.

On the front of the analyzer, SET UP panel, choose XMTR, and on the RESULTS panel, under -STATUS- choose DS1. Then, on the DS1 BERTS XMTR SETUP screen, choose __Misc and on the CLOCK: line, choose __INTERNAL.

INTERNAL clock is selected and there is still a logic one at either pin 9, 10 or 11. Check U14, see **Step Four.**

INTERNAL clock is selected and there is a logic zero at pins 9, 10 and 11. Check for clock pulse on pin 4 of U10.

No clock pulse at pin 4 of U10. Check input of U9, pin 1. Input pulse at pin 1 of U9 and no output means U9 is bad. Replace and remeasure.

Clock pulse at pin 4 of U10. Check input of U14 at pin 28 for 1.544 MHz clock pulse.

Pin 28 of U14 has 1.544 MHz clock pulse. Check U14, **Step Four.**

No input to U14. Replace U10. Verify output of transmitter card and compare to template.

Now, you have checked the transmitter card circuit up to the input of U14 and everything is in order. However, the output of the transmitter card still does not meet template specifications. The next step is to check output amplifier Z3.

Step Three: Check amplifier Z3.

1. Check input of amplifier Z3; both pins 5 and 13 should have +5 volt data pulse, 324 nanoseconds wide.

   No data pulses at either pin 5 or 13. On chip U14, check input pin 28 for 1.544 MHz clock pulse.

   No input clock pulse to U14. Check U14, U13 and U12, see **Step Four.**

   Pin 28 of U14 has 1.544 MHz clock pulse. Check output pin 54 of U14 for 1.544 MHz clock pulse and check input pin 51 for same clock pulse and input pin 50 for selected data pattern.

   No clock pulse at U14 pins 54, 51 or 50. Replace U14. Check input to Z3, pins 5 and 13.

   Correct input at both pins 5 and 13 of Z3. Check output of transmitter card against template, see Figure 3.7.

   Output meets template specifications. Reassemble analyzer and repeat procedures in Section 3.2 that apply to this card.

   Output does not meet specifications. Check output of amplifier Z3, pins 8 and 10, for same data pulses that are are on pin 50 of U14.

   Z3 output not correct. Replace Z3. Go to next step.

   Z3 output correct. Replace transformer T1. Go to next step.

2. Check output of transmitter card for bipolar signal see Figure 3.7. If it meets specifications, reassemble analyzer and repeat procedures in Section 3.2.

You have eliminated all the components of the transmitter card as sources of trouble except the three chips, U14, U13, U12. They are interconnected, and must be tested together, see **Step Four.**

Step Four: Check U14, U13 and U12.

You have checked everything from the input of oscillator U8 to the input pin 28 of U14, and everything from the output amplifier Z3 to the output. Now, the output of the transmitter card is not correct but the input at pin 28 of U14 is correct.

Check pin 28 of U14 for 1.544 MHz clock pulse.

Input clock pulse at U14 on pin 28 is correct. Check U14 for a 1.544 MHz clock pulse at input pin 51 and your selected data pattern at input pin 50.

No clock pulse at pin 51. Replace U13 and check for clock pulse at pin 51 of U14.

Pin 51 of U14 has 1.544 MHz clock pulse. Check output of transmitter card.

Output signal meets specifications. Reassemble analyzer and repeat procedures in Section 3.2.

Output signal does not meet specifications. Check for selected data pattern at output 50 of U14.

Input pin 54 of U14 has 1.544 MHz clock pulse, but input pin 50 does not have selected data pattern. Check pin 54 of U13 for 1.544 MHz clock pulse and pin 55 for selected data pattern.

Clock pulse absent on either pin 54 or 55.

No clock pulse on pin 54; replace U13.
No clock pulse on pin 55; replace U12.
Recheck input clock pulses for U14, pins 50 and 51.

Correct clock pulses at pins 51 and 50. Check transmitter output.

Output signal meets specifications. Reassemble analyzer and repeat procedures of Section 3.2.

At this stage, you have checked all the components of the DS1 section of the transmitter card. If DS1 output signal is still absent, or does not meet specifications, run diagnostic test, Section 3.3.5.

3.3.2.2 No DS3 Signal Out

Have the transmitter card schematic handy (Chapter 5) and refer to Figure 3.19 to locate card components.

On the transmitter card, disconnect DS1 cable from J14, see Figure 3.18, disconnect DS3 cables from J11, J12 and J13 and disconnect clock cables from J22 and J23. Put the transmitter card on the Scientific-Atlanta card extender.

Step One: Check clock oscillator U1.

1. Use oscilloscope to check for TTL level clock pulse of 44.736 MHz at output of crystal oscillator U1, pins 4 and 8. (Square pin is pin 1, number pins counterclockwise.)

   Output signal is correct. Oscillator is OK but something else is wrong. See **Step Two.**

   Output signal is not there. Check input pin 14 for +5 volts dc.

   +5 volts at pin 14 of U1. Replace oscillator U1 and go to step 2.

   No voltage at pin 14 of U1. Go step 3.

2. Check for TTL level clock pulse of 44.736 MHz at pins 4 and 8 of replacement U1.

   Output signal is correct. Reconnect J11, J12, J13, and check transmitter card output for bipolar signal. Figure 3.20, that meets specifications.

   Transmitter output meets specifications. Good, the oscillator was the problem. Remove card extender; reconnect cables to J14, J22 and J23. Plug transmitter card back into analyzer, replace card retainers and replace analyzer top. Turn on the analyzer and repeat procedures in Section 3.2 that apply to this card.

   Transmitter output does not meet specifications. You have problems other than your oscillator. Go to **Step Two.**

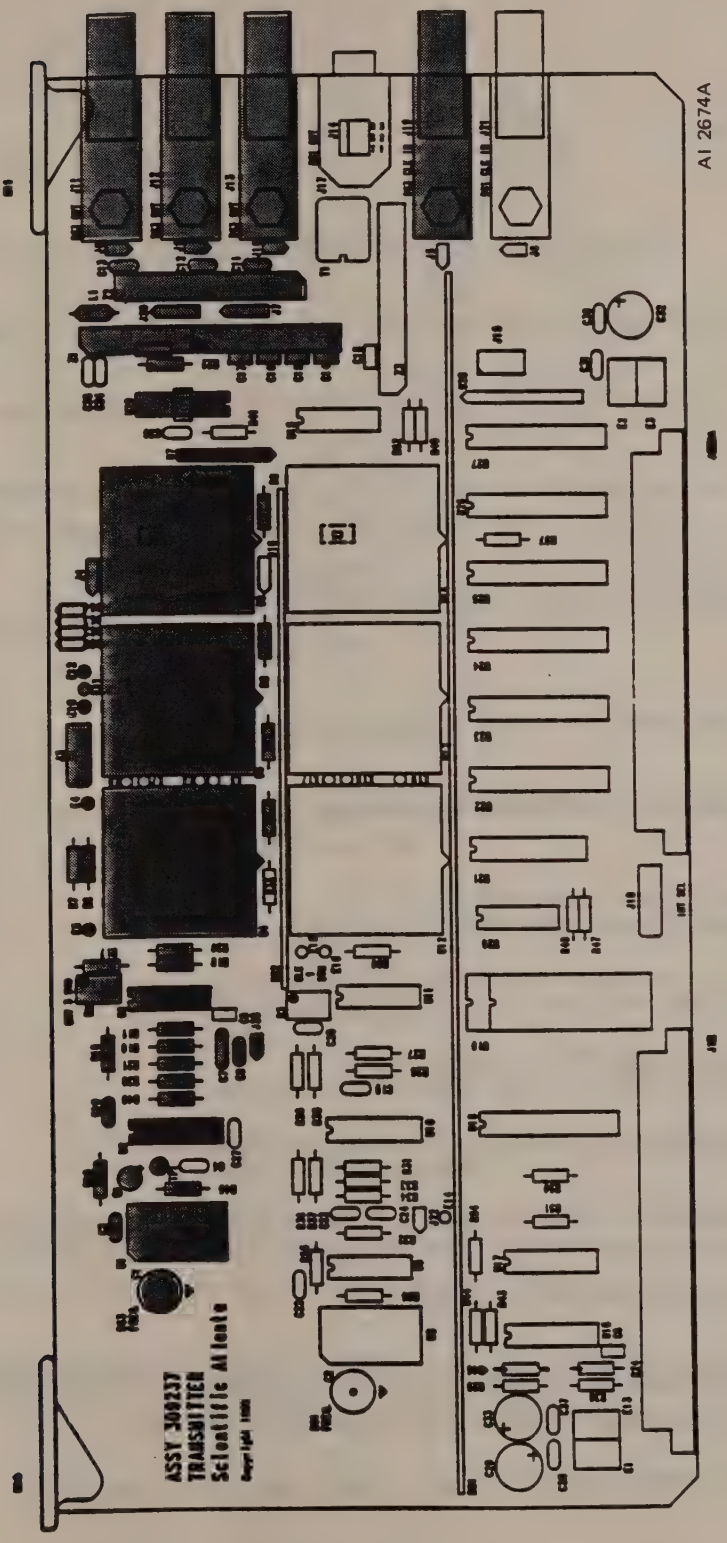


Figure 3.19. DS3 Components of Transmitter Card

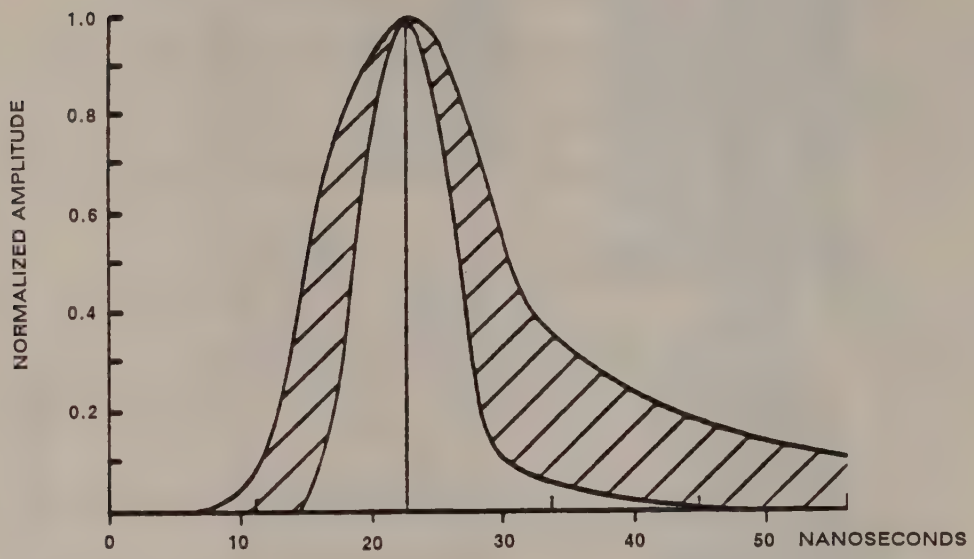


Figure 3.20. DS3 DSX Transmitter Output Signal

3. Check input of oscillator U1, pin 14 for +5 volts.

   No voltage at pin 14 of U1. Check pin 29 of U6 for a logic zero (< +0.4 volts).

   Pin 29 of U6 is logic zero. Replace transistor Q1.

   Pin 29 of U6 is logic one (> +0.4 volts). Check U6; go to **Step Four.**

4. Let's review. Input transistor Q1 is good and crystal oscillator U1 is good. Now check U2 and U3.

5. Check input of U6, pin 28 for 44.736 MHz clock pulse.

   Correct clock pulse at pin 28 of U6. All components from the output of oscillator U1 to pin 28 of U6 are good but the transmitter card output is still bad. Check amplifier Z1, **Step Three.**

Step Two: Check U3.

1. Check for clock pulse at pin 28 of U6.

   No clock pulse at pin 28 of U6. Check for clock pulse at pin 8 of U3.

   Clock pulse at pin 8 of U3. Check for open circuit between pin 28 of U6 and pin 8 of U3.

   No clock pulse at pin 8 of U3. Check for clock pulse at pin 3 of U2 (TP1).

   Clock pulse at output of U2, but not of U3. With your oscilloscope measuring the pulse at pin 8 of U3, adjust R2, see Figure 3.19, until you get a clock pulse with a 50/50 duty cycle.

      You can adjust R2 for the correct clock pulse at pin 8 of U3, and pin 28 of U6. Check transmitter card output for signal, see Figure 3.18.

         Output signal meets specifications. Reassemble analyzer and repeat procedures in Section 3.2.

      You cannot adjust R2 for the correct clock pulse at pin 28 of U6. Replace U3, then check output of transmitter card, see Figure 3.18.

         Transmitter card output correct. Reassemble analyzer and repeat procedures in Section 3.2.

         Transmitter output not correct. Once again, check input of pin 28 of U6.

            U6 input correct. Check U6, U5 and U4, see **Step Four.**

            U6 input still not correct.

2. Let's review. Oscillator U1 is good, U3 is good. But your transmitter output is not right, and your input to U6 is not right. Check input of U2, pin 16 for 44.736 MHz clock pulse.

   No clock pulse at pin 16 of U2. First, check the solder runs between U1 and U2. Then, if they look OK, check the two selector lines on pins 1 and 2 of U2 for logic zero.

      Logic ones on U2, pins 1 and 2. Check DS3 BERTS XMTR SETUP. Here's how you do that.

On the front of the analyzer, choose XMTR, and then, from the SELECT XMTR screen, choose __DS3 BERTS. Then, from the DS3 BERTS XMTR SETUP screen, choose___ Miscellaneous. Then on the CLOCK: line, choose __INTERNAL. Check pins 1 and 2 of U2 for logic zero.

Pins 1 and 2 of U2 still have logic ones. Check U6, U5 and U4, **Step Four.**

Now, you have checked the transmitter card DS3 circuit up to the input of U6 and everything is in order. However, the output of the transmitter card still does not meet specifications. The next step is to check output amplifiers Z1 and Z2.

Step Three: Check amplifiers Z1 and Z2.

1. On the front panel of the analyzer, on the SET UP panel, push XMTR. Screen gives you a choice of DS1 BERTS or DS3 BERTS, see Figure 3.21.

2. Move cursor with arrow keys to __DS3 BERTS and push ENTER. Screen shows DS3 BERTS XMTR SETUP see Figure 3.22.

3. Using arrow keys, move cursor to "Level:" line, in the "__hi" position. Push ENTER. This puts a logic one at input pin 10 of output amplifier Z1.

4. Check Z1 input pins 10, 22, 21 and 19 on amplifier Z1. Pin 10 should have a logic one, pins 22, 21 and 19 should have a logic zero.

   Input voltages at pins 10, 22, 21 or 19 are not correct. Replace U6.

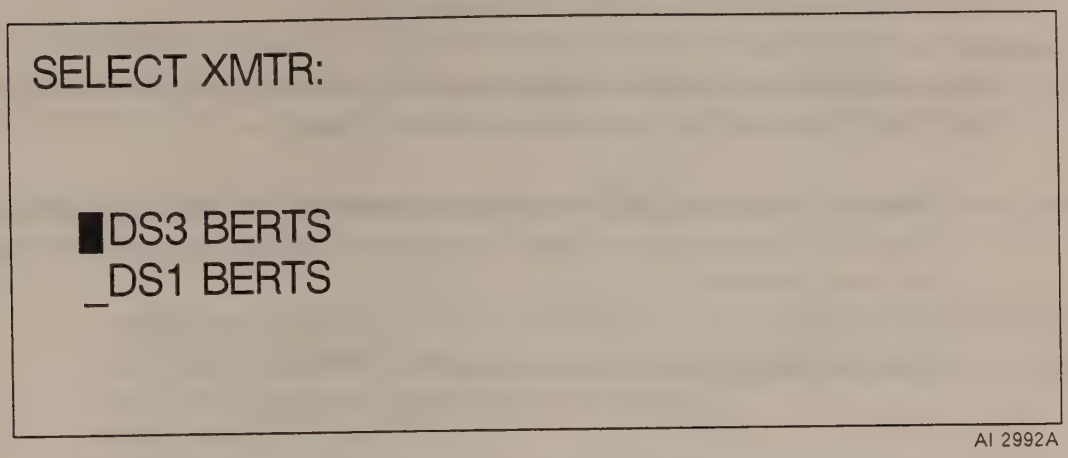


Figure 3.21. SELECT XMTR Screen

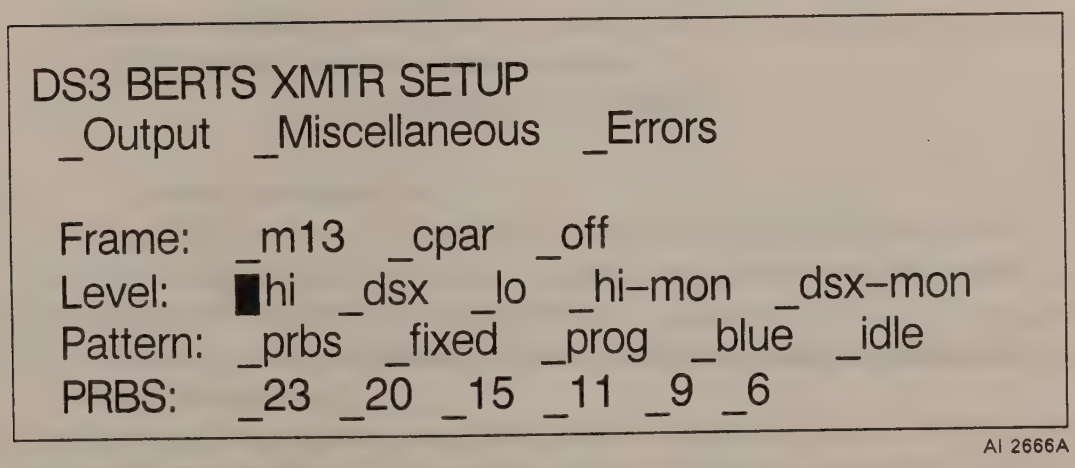


Figure 3.22. DS3 BERTS XMTR SETUP Screen

5. Check Z1 input at pins 5 and 4. Should look like Figure 3.23.

   Input of amplifier Z1 at pins 10, 22, 21, 19, 5 and 4 is correct. Check output at pin 16 for a +1 volt peak bipolar, 11-nanosecond signal that matches template shown in Figure 3.20.

   Output of Z1 at pin 16 is correct. Check output of transmitter card for bipolar signal within template, Figure 3.20. If output meets specifications, reassemble analyzer and repeat procedures in Section 3.2 that apply to this card.

   Output of Z1 at pin 16 is not correct. Replace Z1.

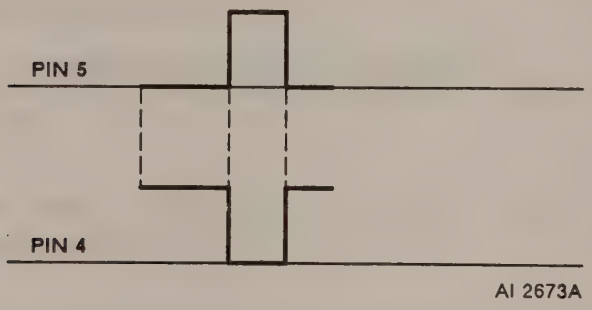


Figure 3.23. Amplifier Z1 Input

6. Check output of buffer Z2 pins 5, 9 and 14 for signal same as Z1 output at pin 16, but inverted. Should also match transmitter card output template.

   Output of Z1 is correct, output of Z2 is not correct. Replace Z2.

Now you have checked the transmitter card DS3 circuit up to the input of U6 and everything is in order. However, U6 is interconnected with U5 and U4 and the next step is to check the three chips together.

Step Four: Checking U6, U5 and U4.

You have checked everything from the input of oscillator U1 to the input pin 28 of U6, and everything from the output amplifier Z1 to the output. Now, the output of the transmitter card is not correct and the input to pin 28 of U6 is correct.

Input signal to U6 on pin 28 is correct. Check U6 for a 44.736 MHz clock pulse at input pin 51 and a selected data pattern on input pin 50.

No clock pulse on pin 51. Replace U5 and check for clock pulse on pin 51. If clock pulse is good, check output of transmitter card. If output signal meets specifications, U5 was your problem. Reassemble analyzer and repeat procedures in Section 3.2.

Clock pulse on input pin 51 but no clock pulse on input pin 50. Check U5 output; pin 54 should have clock pulse, pin 55 should have selected data pattern.

Pulse absent on either pin 54 or 55.
No pulse on pin 54; replace U5.
No pulse on pin 55; replace U4.
Recheck input pulses for pins 50, 51, and 28.

Correct pulses on pins 51 and 50. Check transmitter output. If output signal meets specifications, reassemble analyzer and repeat procedures in Section 3.2.

3.3.2.3 No DS1 or DS3 Signals Out

When your front-panel tests show no output from either DS1 or DS3 channels, or if the screen has an error message TRANSMITTER CHANNELS NOT INSTALLED, and the transmitter card is in place, the problem may be in the bus interface. Have the transmitter card bus interface schematic handy (Chapter 5) and refer to Figure 3.24 to find card components.

1. Turn off analyzer power.

2. Connect oscilloscope to pin 11 of ROM Screen Pointer Latch U21.

3. Turn analyzer power on. On your oscilloscope, you should see pulses for a few seconds.

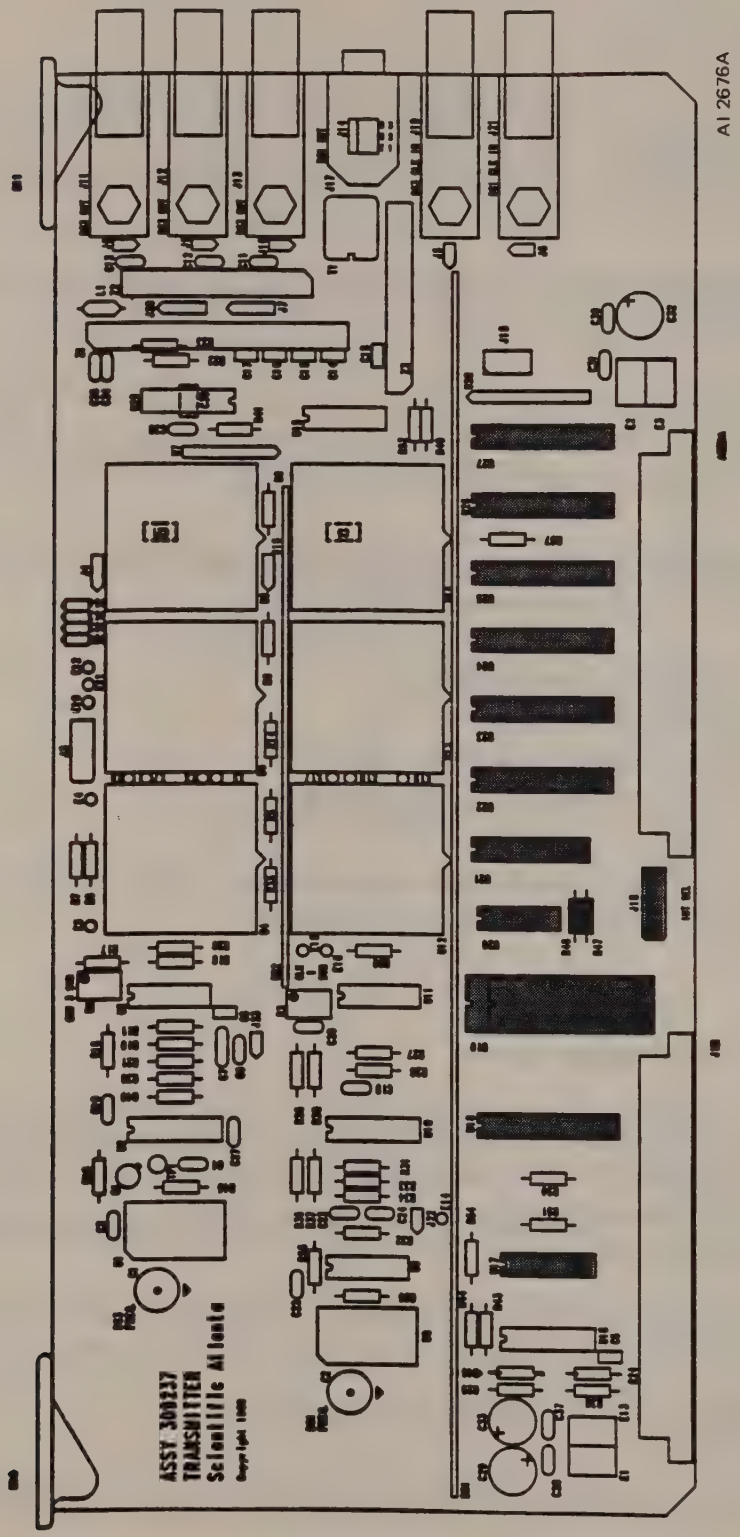


Figure 3.24. Transmitter Bus Interface Components

Pulses are on pin 11 of U21. Error message TRANSMITTER CHANNELS NOT INSTALLED is still on screen. Turn analyzer off. Connect oscilloscope to pins 1 and 11 of U21. Turn analzyer on.

Outputs of U21, pins 1 and 11, switch. Replace U19.

Outputs of U21, pins 1 and 11, do not switch. Replace U21.

Pulses are at pins 1 and 11 of U21, the error message is gone, and you can change the "screen" readings. Check front-panel connectors DS1 TX and DS3 TX1 for output signal.

No output at DS1 TX or DS3 TX1. Check output of U17 for a logic one on all output lines.

U17 outputs are continuously low (< +0,4 volts). Replace Reset Control Chip U17. If changing U17 doesn't solve the problem, replace U27.

No pulses on input of U21, pin 11. Remove and replace, in this order chips U22, U23, U24, U26, U25 and U27.

You've done all you can do to fix the transmitter card. If DS1 or DS3, or both signals are absent or out of specifications, your next step is the diagnostic test detailed in Section 3.3.5.

3.3.3 Demux Card

NOTE

Check the transmitter card before you check the demux card.
See Section 3.3.2.

Several steps in the external troubleshooting procedure point you toward the demux card, but all the indications are the same: on the front of the AT 9500 Analyzer, on the STATUS panel, the LOS light, the OOF light, or the PATT LOSS light is lit for DS1, DS3 or for both. This situation, or dribbling errors, indicate trouble in the demux.

The demux card has five diagnostic LEDs on the top edge. Here's what these LEDs indicate:

Front Panel Light	What It Means	Card Marked	Reference Designator
DS1	Frame Loss	1FL	DS5
DS1	Pattern Loss	1PL	DS2
DS2	Frame Loss	2FL	DS1
DS3	Frame Loss	3FL	DS4
DS3	Pattern Loss	3PL	DS3

The LEDs give hardware status. The front-panel indicators give hardware status as seen by the CPU. Occasionally, it is convenient to compare readings to help isolate problems.

NOTE

Some integrated circuits on the demux card are programmed and can only be replaced by Scientific-Atlanta. They are in the Parts List, Chapter 4, but are also listed here for your convenience.

Reference Designator	Scientific-Atlanta Part Number
U1	0307959
U10	0457000
U28	0307951
U29	0306224
U36	0457001
U38	0307957
U40	0307963
U2	0327877
U3	0327878
U4	0327877
U5	0327876
U9	0327875
U17	0327878
U18	0327877
U19	0327876
U24	0327875
U26	0355983
Y1	0318996
Z1	0327940
Z2	0327944
	0457017 (Set)

3.3.3.1 DS1 Circuit

In the procedure you will be asked to check for data pattern 1010. Figure 3.25 is data pattern 1010 with no framing.

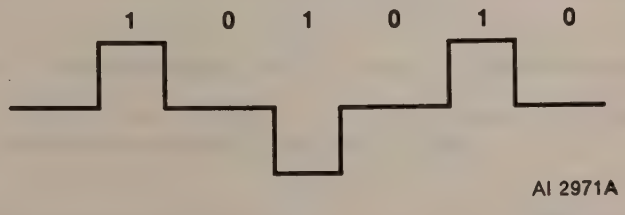


Figure 3.25. Data Pattern 1010

Here's how you get data pattern 1010.

1. On the front of the analyzer, on the SET UP panel, push XMTR button. SELECT XMTR screen gives you your choice of __DS1 BERTS or __DS3 BERTS, see Figure 3.26.

2. Choose __DS1 BERTS and push ENTER. Screen will now show DS1 BERTS XMTR SETUP, see Figure 3.27.

3. Move cursor to "Frame:" line, position "__none" and push ENTER.

4. On the "Pattern:" line, move cursor to "__fixed" and push ENTER.

5. On the "Fixed:" line, move cursor to "__1010" and push ENTER. These settings will produce data pattern 1010, see Figure 3.25.

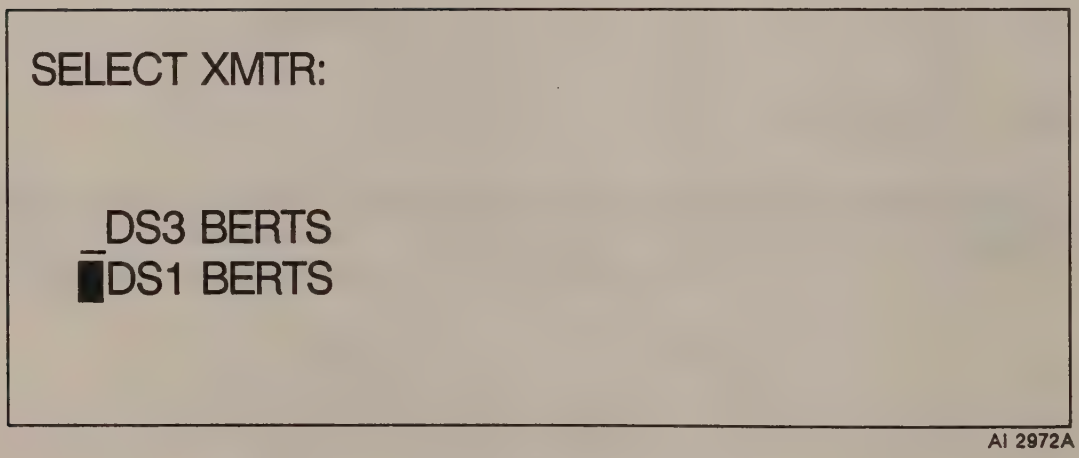


Figure 3.26. SELECT XMTR Screen

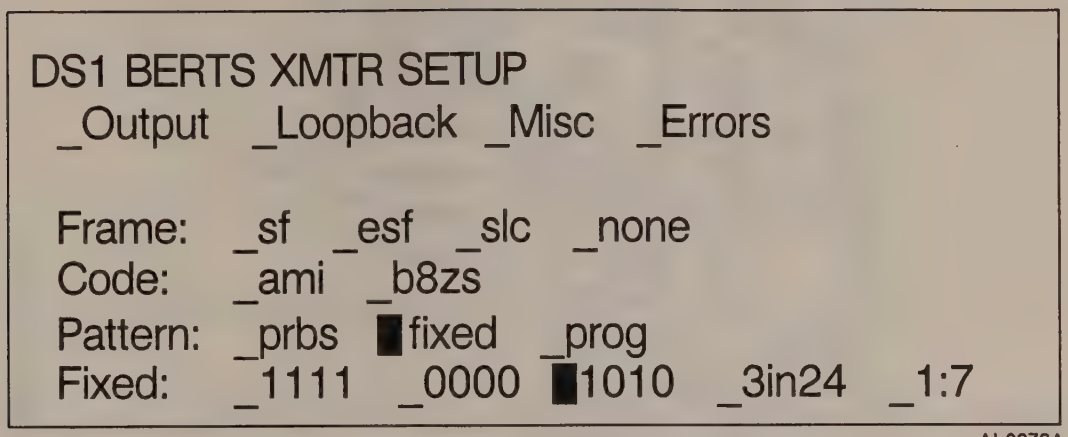


Figure 3.27. DS1 BERTS XMTR SETUP Screen

Step One: DS1 LOS light is on.

LOS stands for *Loss Of Signal,* and when the LOS light is on it indicates potential trouble in two areas: Either the clock recovery signal is not phase-locked with the input signal or, there is no input signal at all.

1. Put the demux card on the Scientific-Atlanta card extender.

2. Have the demux card schematic handy and refer to Figure 3.28 to locate components.

3. Use oscilloscope to check for data pattern 1010 at pin 11 of U24.

   No data pattern 1010 at output pin 11 of U24. Check input pin 23 of U24 for data pattern 1010.

   Data pattern 1010 at input pin 23. Replace U24.

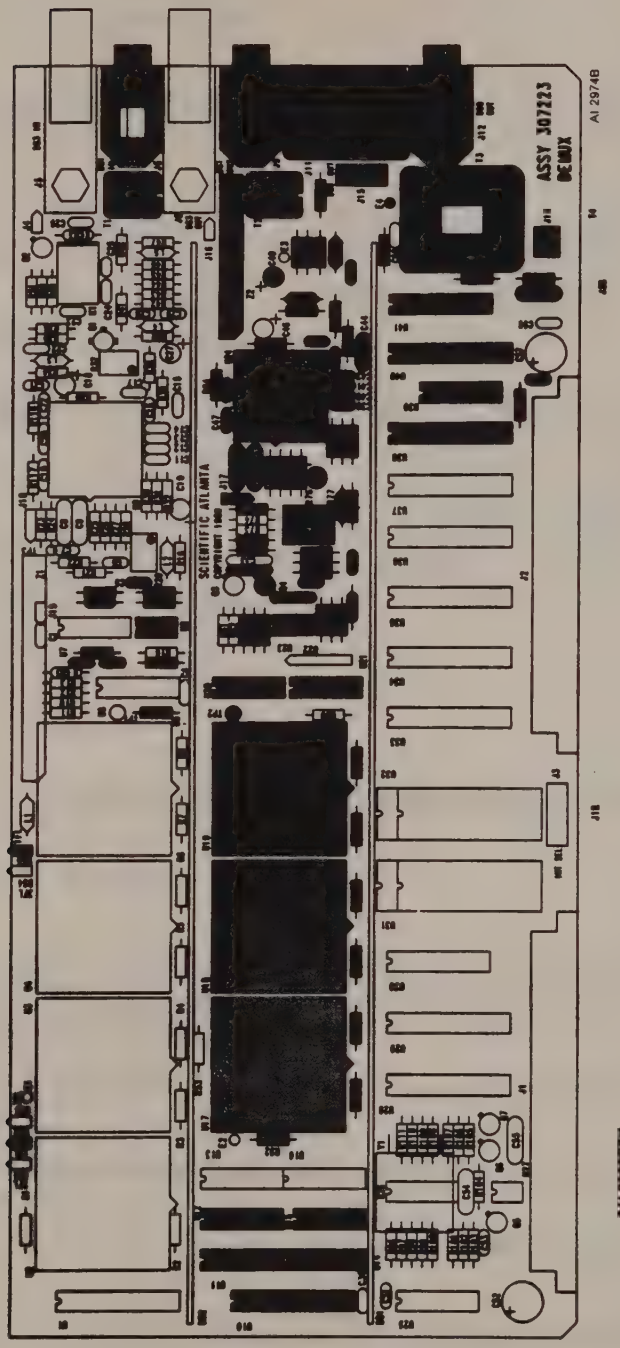


Figure 3.28. DS1 Components of Demux Card

Still no data pattern 1010 at pin 23 of U24. Check cable at connection J7 and input; check input to transformer T1, pin 3, for data pattern 1010.

Data pattern 1010 is at pin 3 of transformer T1. Replace T1.

NOTE

A standard TTL clcok pulse low is less than 0.8 volts and a TTL clock pulse high is more than 2.4 volts.

Data pattern 1010 is at output pin 11 of U24. With oscilloscope check for TTL 1.544 MHz clock pulse at pin 30 of U24.

There are three possibilities; the TTL clock pulse is not there, the TTL clock pulse is there at 1.544 MHz, or the TTL clock pulse is there but not at 1.544 MHz.

No TTL clock pulse at pin 30 of U24. Replace chip U24. Recheck for TTL clock pulse at pin 30 of U24.

No TTL clock pulse at pin 30 of U24. Check pin 5 of U24 for +5 volts ±5%.

No voltage at pin 5 of U24. Check R78 and L6 for short or open circuits.

TTL clock pulse at 1.544 MHz is at pin 30 of U24. Check pin 28 of U24 for +5 volts dc.

-5 volts dc at pin 28 of U24. Replace U24.

+5 volts dc at pin 28 of U24. Check U19, pin 20 for a logic high (> +2.4 volts).

Pin 20 of U19 has logic high. Verify phase lock by checking U19 pin 12 for logic low (< +0.8 volts).

U19 pin 12 has logic low. Replace U19.

TTL clock pulse is at pin 30 of U24 but not at 1.544 MHz. Adjust phase lock. Here's how you do that. First, make sure U19 is good. Check pin 12 of U19 for logic low.

Pin 12 of U19 has logic low. Replace U19.

(1) With no signal applied, move jumper on J17 to pins 1 and 2.
(2) Set R76 approximately in the middle of its range.
(3) Connect frequency counter to TP2.
(4) Adjust R77 until frequency counter reads 1.60 to 1.61 MHz.
(5) Short pin 6 of U24 to -5 volts dc (pin 8) and adjust R76 for a frequency of 1.49 to 1.50 MHz.
(6) Move jumper back to pins 2 and 3 on J17, disconnect the short on pin 6 of U24, and adjust R77 for a frequency of 1.590 to 1.595 MHz.
(7) Repeat steps (1) through (6) until frequency range is 1.50 to 1.59 MHz.

DS1 LOS light goes off. Clock recovery signal is phase-locked with the input signal. Put demux card back in analyzer, reassemble analyzer and repeat front-panel tests, Section 3.2, that apply to this card.

DS1 LOS stays on. Set oscilloscope on 100 millivolt scale, and check signal at pin 6 of U24 for a triangular sweep wave going above and below zero.

Triangular wave on pin 6 of U24. Replace U24.

No triangular wave on pin 6 of U24. Replace U8.

4. Let's review. The DS1 LOS light is still on. U24 is good, and so are the components associated with it. Check U19 pin 58 for 50 millisecond latch signal.

50 millisecond signal at pin 58 of U19. Replace U19.

No signal at pin 58 of U19. Check input of buffer U21, pin 9.

50 millisecond signal at pin 9 of U21. Replace U21.

No signal at pin 9 of U21. Run diagnostic test, Section 3.3.5.

Step Two: DS1 OOF light is on, DS1 PATT LOSS light is on and DS1 LOS light is off.

Check if framing is on. Here's how you do that.

1. On the front of the analyzer, on the SET UP panel, push XMTR button. SELECT screen will give you your choice of __DS3 BERTS or __DS1 BERTS.

2. Choose __DS1 BERTS and push ENTER. Screen will show DS1 BERTS XMTR SETUP, see Figure 3.29.

3. Move cursor to "__Output" and push ENTER.

   Cursor on "Frame:" line at either "sf," "esf," or "slc," Framing is on.

   Cursor is at "none," With arrow key, move cursor to "__sf" and push ENTER.

4. Move cursor to "Pattern:" line at "__fixed" and push ENTER.

5. Move cursor to "Fixed:" line at "__1111" and push ENTER.

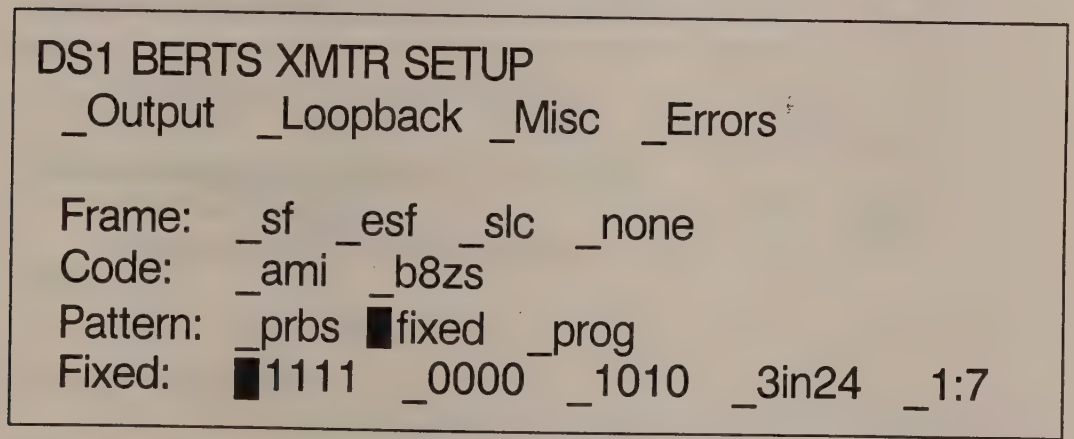


Figure 3.29. DS1 BERTS XMTR SETUP Screen

DS1 OOF and DS1 PATT LOSS lights are still on. With oscilloscope, check pin 55 of U19 for a data pulse with a flickering, framing bit. It looks like Figure 3.30.

All 1s data pulse with framing bit is at pin 55 of U19. Replace U18.

No data pulse at pin 55 of U19. Replace U19.

Still no data pulse at pin 55 of U19. Verify phase lock by checking U19, pin 12, for a TTL low (< +0.8 volts).

Pin 12 of U19 is low. Replace U19. Check pin 30 of U24 for TTL clock pulse of 1.544 MHz.

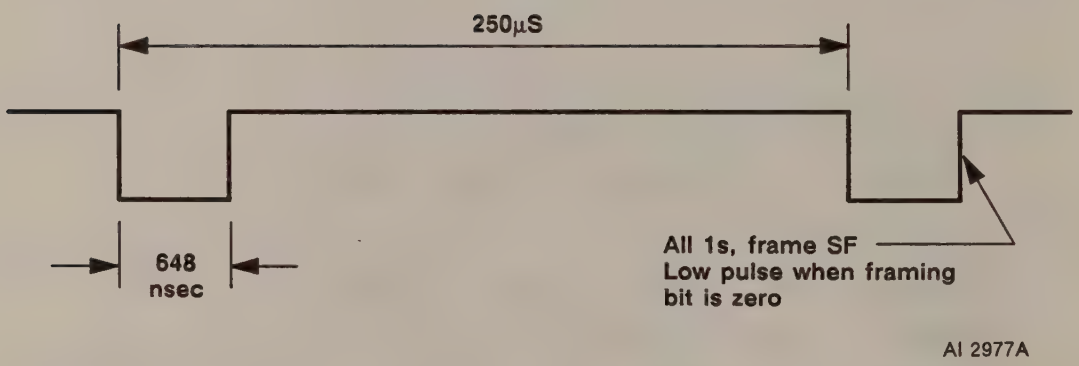


Figure 3.30. Data Pulse With Framing Bit

TTL clock signal is at pin 30 of U24 but not at 1.544 MHz. Adjust phase lock. Here's how you do that.

(1) With no signal applied, move jumper to pins 1 and 2 of J17.

(2) Set R76 approximately in the middle of its range.

(3) Connect frequency counter to TP2.

(4) Adjust R77 until frequency counter reads 1.60 to 1.61 MHz.

(5) Short pin 6 of U24 to -5 volts dc (pin 8) and adjust R76 for a frequency of 1.49 to 1.50 MHz.

(6) Move jumper back to pins 2 and 3 on J17, disconnect the short on pin 6 of U24, and adjust R77 for a frequency of 1.590 to 1.595 MHz.

(7) Repeat steps (1) through (6) until frequency range is 1.50 to 1.59 MHz.

Step Three: OOF light off, PATT LOSS light on, LOS light off.

Check pin 16 of U17 for a 1.544 MHz clock pulse with pulses gapped out every 125 microseconds (corresponding to framing bit locations) and pin 15 of U17 for all 1s data.

Correct clock pulses at pins 16 and 15 of U17. Replace U17.

All lights go off. Check frequency, **Step Five.**

No clock pulses at pins 16 and 15 of U17. Replace U18.

All lights go off. Check frequency, **Step Five.**

Step Four: Check DS1 A1S light.

1. On the front of the analyzer, on the SET UP panel, push XMTR button. SELECT screen gives you choice of __DS1 BERTS or __DS3 BERTS, see Figure 3.31.

2. Choose __DS1 BERTS and push ENTER. Screen will now show DS1 BERTS XMTR SETUP screen, see Figure 3.32.

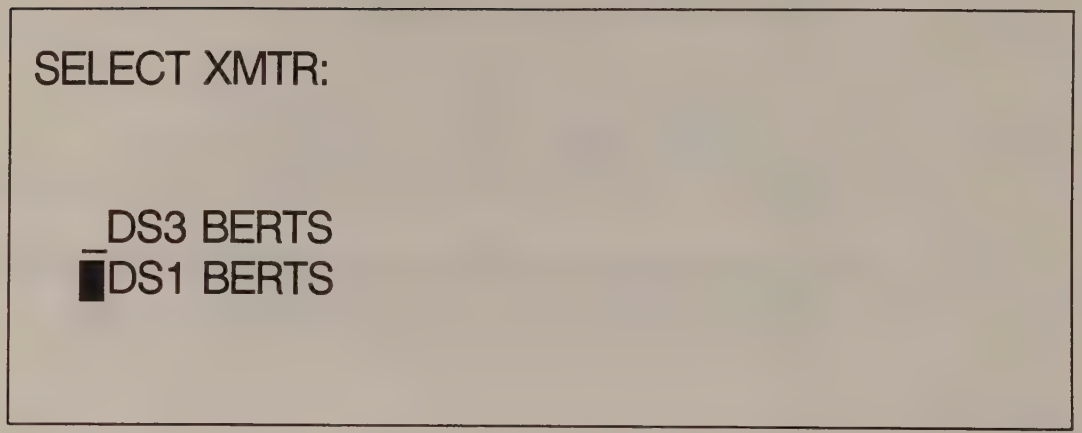


Figure 3.31. SELECT XMTR Screen

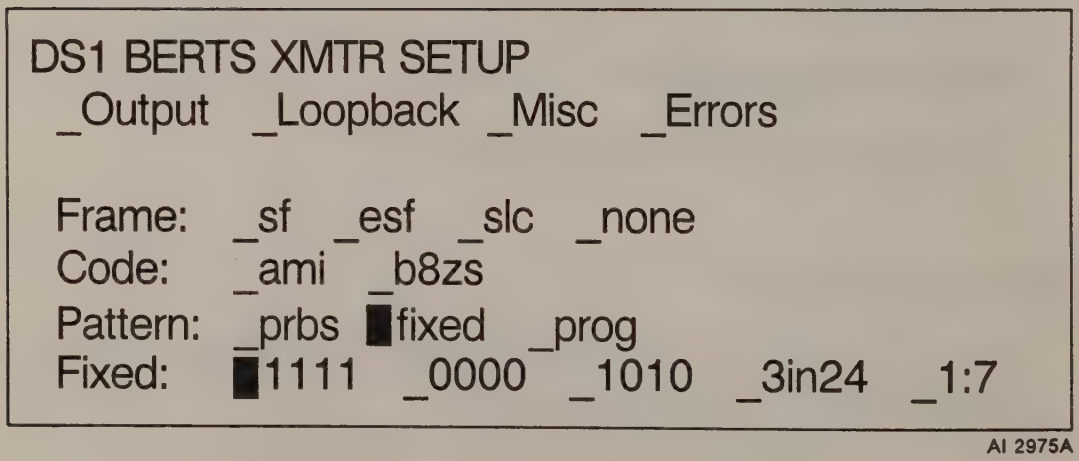


Figure 3.32. DS1 BERTS XMTR SETUP Screen

3. With arrow key, move cursor to "__Output" and push ENTER. On "Frame:" line, move the cursor with the arrow keys to "__none" and push ENTER.

4. On the "Pattern:" line, move cursor to "__fixed" and push ENTER.

5. On the "Fixed:" line, move cursor to "__1111" and push ENTER.

DS1 A1S light comes on. Put demux card back in analyzer, reassemble analyzer, and repeat front-panel tests, Section 3.2, that apply to this card.

DS1 A1S light does not come on. Replace U18.

Step Five: Check frequency.

On the front of the analyzer, on the RESULTS panel, push STATUS DS1. The status screen should show "__Freq(1.544)" which means the DS1 output frequency is 1.544 MHz.

DS1 input signal frequency is 1.544 MHz. Remove card extender, plug demux card back into mothercard, replace card retainers and replace analyzer top. Turn on the analyzer and repeat front-panel test, Section 3.2.

No DS1 frequency measurement (screen reads " Freq(n/a)"). With oscilloscope check signal on pin 11 of U12 for a +5 V square wave.

No square wave at pin 11 of U12. Check pin 7 of connector J2B.

Square wave at pin 7 of J2B. Replace U10.

Square wave is not at pin 7 of J2B. Proceed to Section 3.3.6, Mothercard.

Square wave is at pin 11 of U12. Check pin 13 of U12 for latch signal, + 5 V, 2.6 microseconds wide, 50 milliseconds apart.

Latch signal at pin 13 of U12. Replace U12 and, if necessary, U11.

No latch signal at pin 13 of U12. Replace U10 and, if necessary, U19.

Still no latch signal at pin 13 of U12. Check for 50 millisecond latch signal at pin 58 of U19.

No latch signal at pin 58 of U19. Check J2B pin 27 for 50 millisecond latch signal.

Latch signal at J2B pin 27. Replace buffer U21.

No signal at J2B pin 27. Run diagnostic test, see Section 3.3.5.

Step Six: Check DS1 to DS0 demultiplexing.

1. On the front of the analyzer, on the SET UP panel, push XMTR button. SELECT screen gives you choice of __DS1 BERTS or __DS3 BERTS, see Figure 3.33.

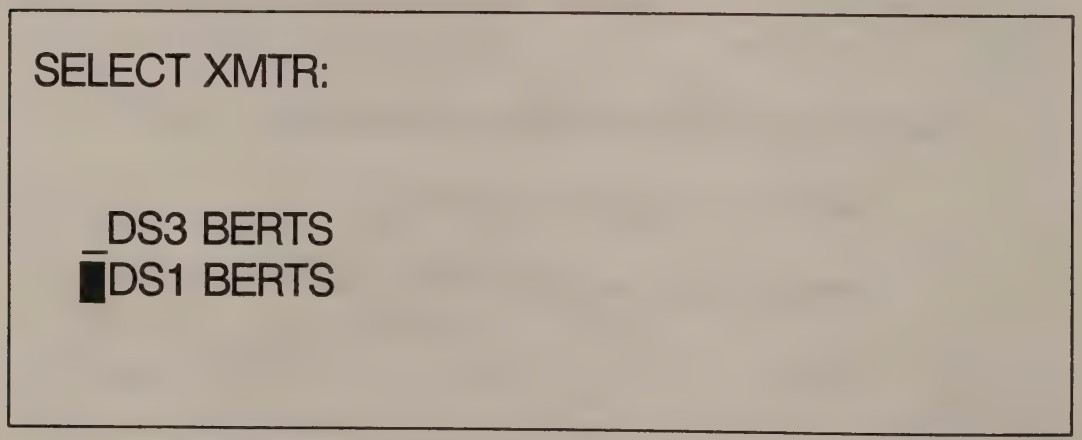


Figure 3.33. SELECT XMTR Screen

2. Move cursor to __DS1 BERTS and push ENTER. Screen shows DS1 BERTS XMTR SETUP, see Figure 3.34.

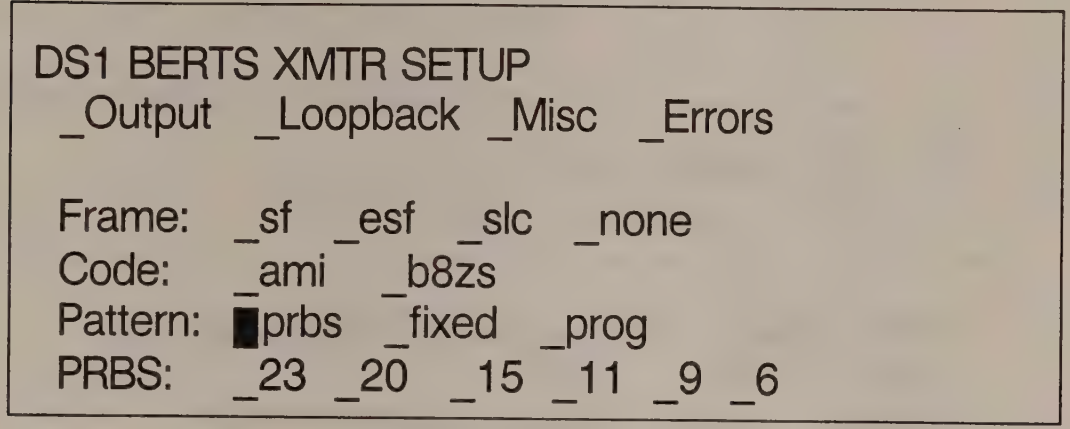


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Figure 3.34. DS1 BERTS XMTR SETUP Screen

3. Use arrow key to move cursor to "__Output" and push ENTER.

4. On the "Frame:" line, move cursor to "__sf" and push ENTER.

5. On the "Pattern:" line, move cursor to "__prbs" and push ENTER.

6. On front panel, turn VOLUME up (clockwise).

Noise similar to AM static. With headphones, check for audio static at VF OUT connector on front panel.

Static in headphones and on speaker. DS1 to DS0 demultiplexer is good. Check the real-time clock with diagnostic test, Section 3.3.5.

Static on speaker, but not on headphones. Check cable connection to J13 and then transformer T3.

No static on headphones or speaker. Check DS1 OOF light.

DS1 OOF light is on. Check DS1 framing. Here's how you do that.

1. On the front of the analyzer, on the SET UP panel, push XMTR button. On SELECT XMTR screen, choose __DS1 BERTS and push ENTER. Screen shows DS1 BERTS XMTR SETUP, see Figure 3.35.

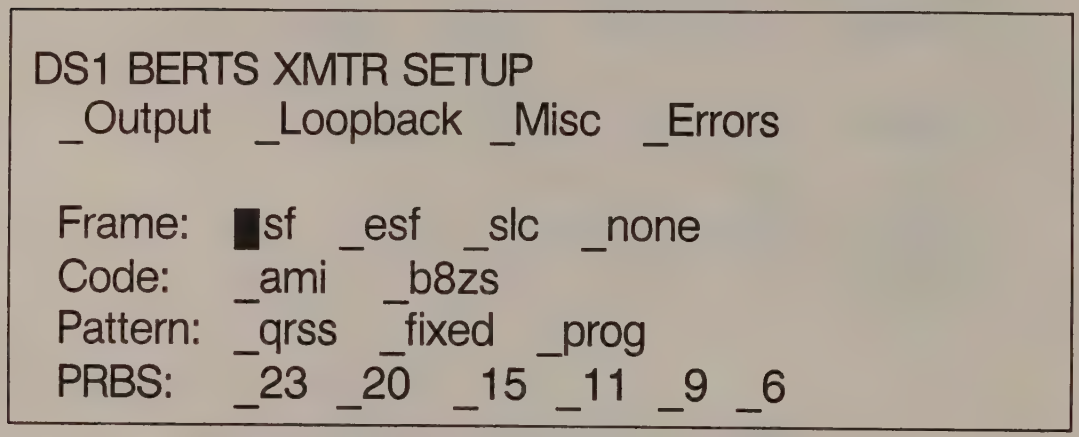


Figure 3.35. DS1 BERTS XMTR SETUP Screen

2. With arrow key, move cursor to "__Output" and push ENTER.

   Cursor on "Frame:" line at either "sf" or "esf." Framing is on.

   Cursor is at "none." Move cursor to "__sf", push ENTER.

   DS1 OOF light is off. Go to **Step Seven,** check DS0 Audio Output.

   DS1 OOF light is on. Go to **Step Two,** check DS1 OOF light on.

Step Seven: Check DS0 audio output.

Here's the situation. DS1 LOS and DS1 OOF lights are off, input pattern is framed PRBS, but there is no static when the volume control is turned up.

Check U41 pin 11 for a 1.544 MHz ungapped clock pulse.

Ungapped clock pulse is not at pin 11 of U41. Replace U18.

Ungapped clock pulse is at pin 11 of U41. Check pin 9 of U41 for an 8 kHz strobe.

8 kHz strobe not at pin 9 of U41. Replace U18 and recheck pin 9 of U41 for an 8 kHz strobe.

No 8 kHz strobe at pin 9 of U41. Check pin 28 of U18 for 8 kHz strobe.

8 kHz strobe not at pin 28 of U18. Replace U40.

8 kHz strobe is present at pin 9 of U41. Check pin 8 of U41 for a changing data pattern.

Changing data pattern at pin 8 of U41. Replace U41.

No changing data pattern at pin 8 of U41. Replace U18.

Step Eight: Check digital output.

The digital output of the demux card is checked on connector J11, which, on the front panel of the analyzer, is labeled DS0 OUT. With your oscilloscope check pin 8 of the DS0 OUT connector for a TTL signal with pulses 15.6 microseconds wide and 125 milliseconds apart. This is the octet end marker, see Figure 3.36.

Octet end marker is at pin 8 of J11. Check J11, pin 7 for 64 kHz clock pulse (TTL level) *and* check J11 pin 6 for data transitions (TTL level), see Figure 3.36.

Octet end marker is not at pin 8 of J11, *or* 64 kHz clock pulse is not at pin 7, *or* data transitions are not at pin 6. Check pin 10 of U40 for data, pin 7 of U40 for a clock pulse and pin 11 of U40 for octet end marker.

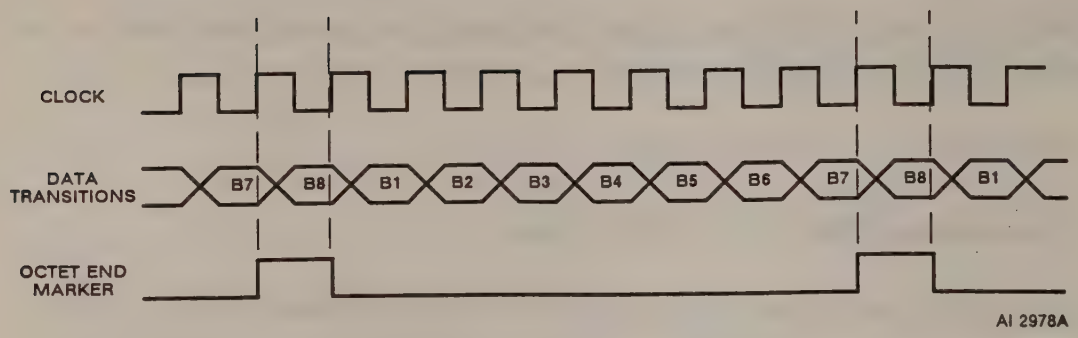


Figure 3.36. Timing Diagram

Any of the pulses at pin 8, 7 or 6. Replace U40.

No pulses at either pin 8, 7 or 6. Check U39, pin 9 for a high TTL level (> +2.4 volts).

Pulse at pin 9 of U39 is not at high TTL level. Check front panel DS1 OOF light.

Pulse at pin 9 of U39 is at high TTL level. Check U39 pin 4 for data transitions and U39 pin 3 for clock pulse.

No data transitions at pin 4 of U39. Replace U18.

No clock pulse at pin 3 of U39. Check pin 1 of U38 for clock pulse.

No clock pulse at pin 1 of U38. Replace U18 and check pin 3 of U38 for logic zero.

No logic zero at pin 3 of U38. Replace U40.

Logic zero at pin 3 of U38. Replace U38.

Step Nine: Check DS1 THRU output.

1. On the front of the analyzer panel, on the SETUP panel, push XMTR button. SELECT screen will give you

the choice of __DS3 BERTS or __DS1 BERTS; choose __DS1 BERTS and push ENTER. Screen will show DS1 BERTS XMTR SETUP, see Figure 3.37.

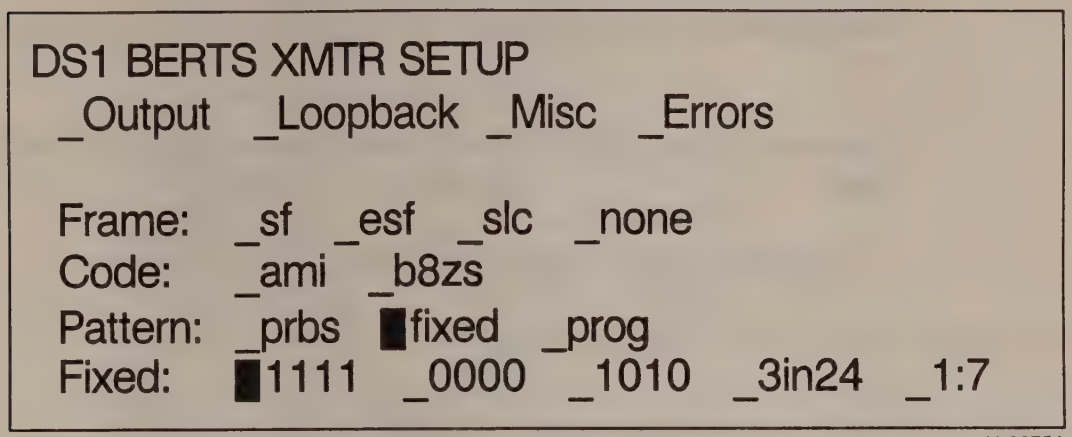


Figure 3.37. DS1 BERTS XMTR SETUP Screen

2. With the arrow keys, move cursor to "__Output" and push ENTER.

   Cursor on "Frame:" line at either "sf," "esf," or "slc." Framing is on.

   Cursor is at "none." With arrow keys, move cursor to "__sf " and push ENTER.

3. Move cursor on "Pattern:" line to "__fixed" and push ENTER.

4. Move cursor on "Fixed:" line at "__1111" and push ENTER.

5. Connect DS1 signal to the DS1 RX connector on the front panel.

   DS1, OOF and PATT LOSS lights go off. Apply a 100-ohm differential terminator to the DS1 DROP/THRU output. Connect oscilloscope CH.1 and CH.2, invert and add, and check for a 6 volt peak-to-peak output.

No output from DS1 THRU. Check U19, pins 37 and 38 for CMOS level high data pulses.

Pulses are present at U19, pins 37 and 38. Replace Z2. If replacing Z2 doesn't help, replace T2.

No pulses at U19, pins 37 and 38. Replace U19 and recheck for signal at DS1 DROP/THRU output.

Still no signal at DS1 A DROP/THRU. Run diagnostic test, Section 3.3.5.

This is all you can do for the DS1 circuit of the demux.

Here's the procedure for troubleshooting the demux DS3 circuit.

3.3.3.2 DS3 Circuit

Step One: DS3 LOS light is on.

Have the demux card schematic handy and refer to Figure 3.38 to locate components.

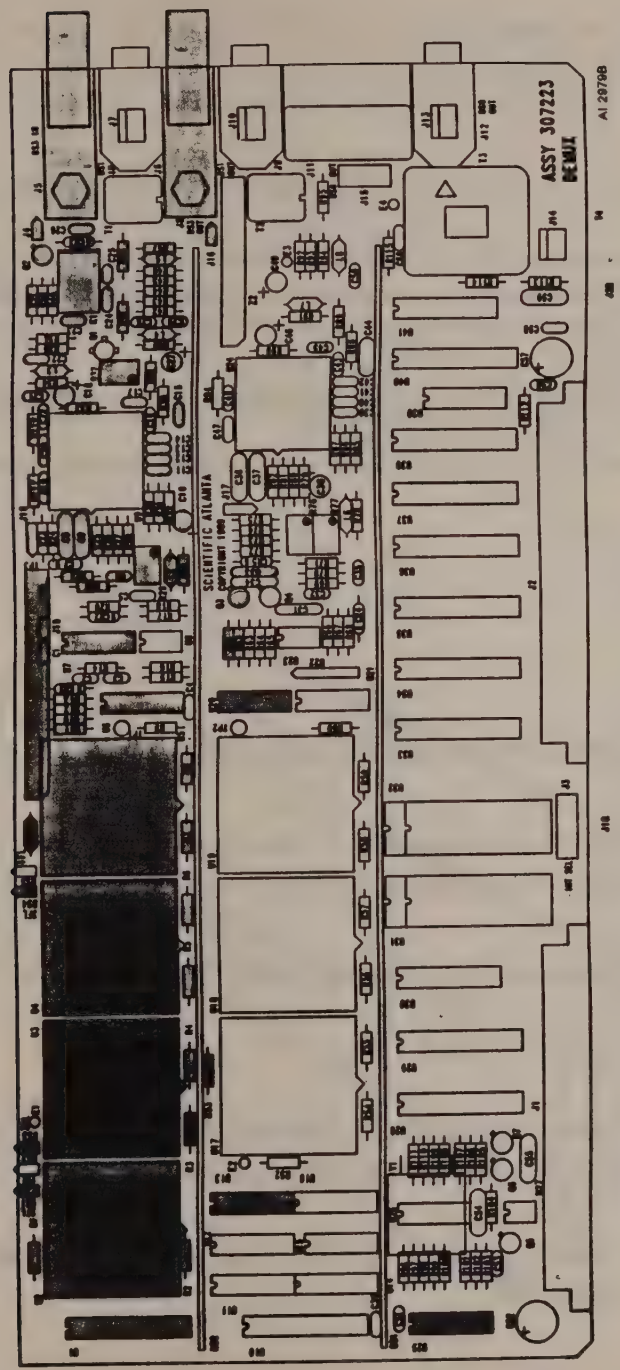


Figure 3.38. DS3 Components of Demux Card

Disconnect front-panel cables from demux card at J8, J10, J5, J7, J13 and J15. Put the demux card on the Scientific-Atlanta card extender, see Figure 3.39.

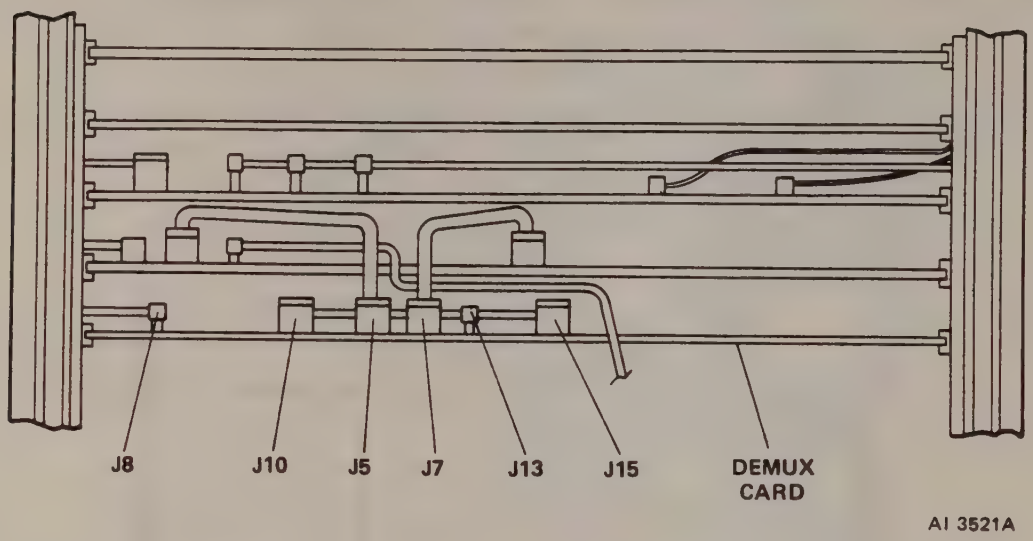


Figure 3.39. Demux Card Internal Cables

Check supply voltages at points shown in Figure 3.40. On demux card, connector J2 pin C-2, check for +5 volts ±0.25 volts. On connector J2 pin C-30, check for 5.2 volts ± 0.25 volts.

In this procedure you will be asked to look for data pattern 1010. Figure 3.41 is data pattern 1010.

Here's how you get data pattern 1010.

1. On front panel of analyzer, on the SETUP panel, push XMTR key. You'll see a select screen that will give you a choice of __DS1 BERTS or __DS3 BERTS, see Figure 3.42.

2. Use the arrow keys to move cursor and choose __DS3 BERTS and push ENTER. You'll see DS3 BERTS XMTR SETUP screen, see Figure 3.43.

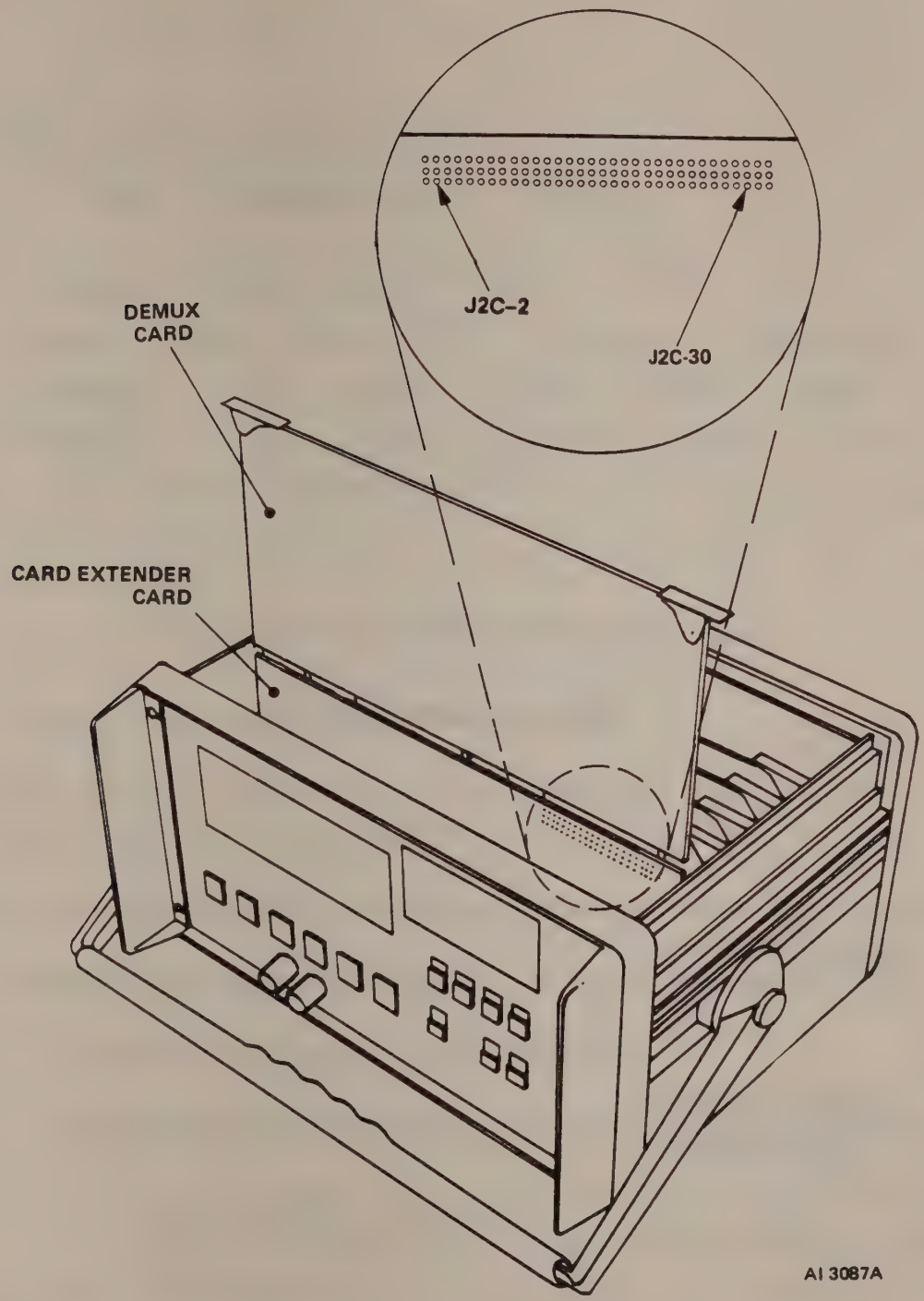


Figure 3.40. Voltage Checkpoints

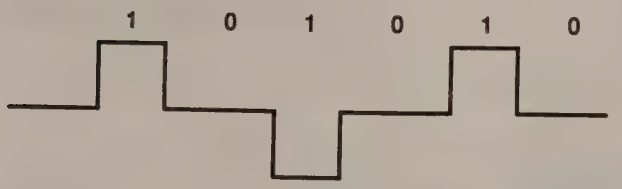


Figure 3.41. Data Pattern 1010

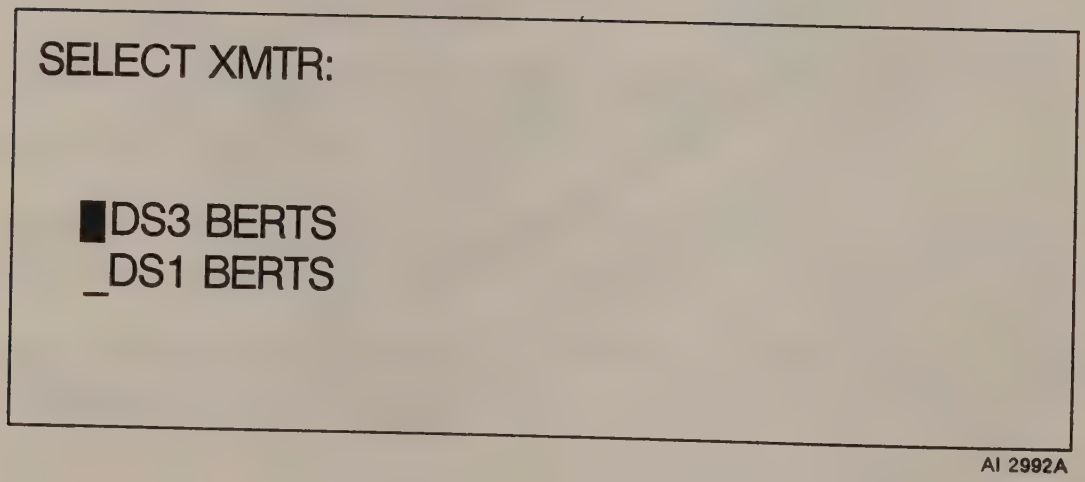


Figure 3.42. SELECT XMTR Screen

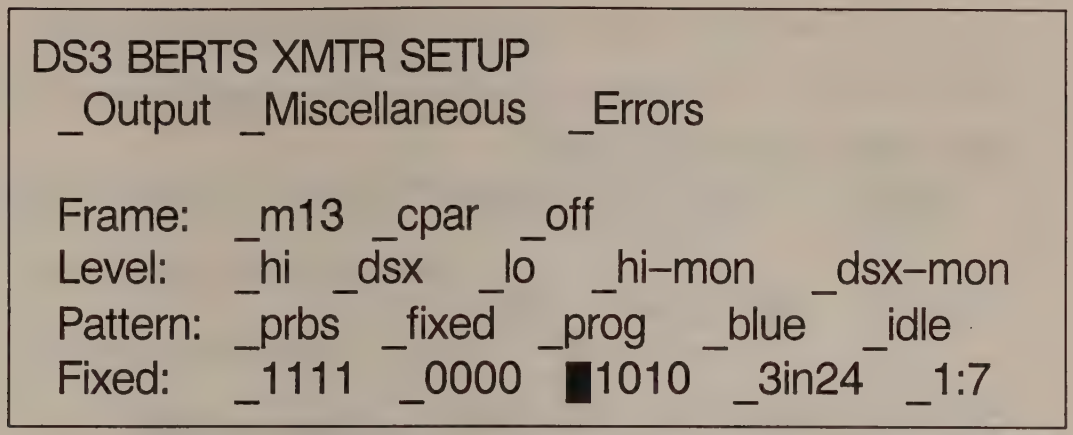


Figure 3.43. DS3 BERTS XMTR SETUP Screen

3. Use arrow key to move cursor to "__Output" and push ENTER.

4. Then, move cursor to "Frame:" line, to "__off," push ENTER, then to the "__Pattern:" line, choose "__fixed" and on the "Fixed:" line, choose "__1010."

5. Use oscilloscope with FET probe to check output pin 11 of U9 for data pattern 1010, see Figure 3.41.

   No data pattern 1010 at output pin 11 of U9. Check input pin 23 of U9 for data pattern 1010.

   Data pattern 1010 is at input pin 23 of U9. Replace U9.

   Data pattern 1010 not at input pin 23 of U9. Check input to relay K1, pin 10 for data pattern 1010.

   Data pattern 1010 is at pin 10 of relay K1. On front panel of analyzer, on SETUP panel, push RCVR, then choose DS3. You'll see DS3 BERTS RCVR SETUP screen, see Figure 3.44.

6. On "Level:" line, move cursor to "__dsx/low" and press ENTER. Now, back to relay K1. You have data pattern 1010 at pin 10 of relay K1.

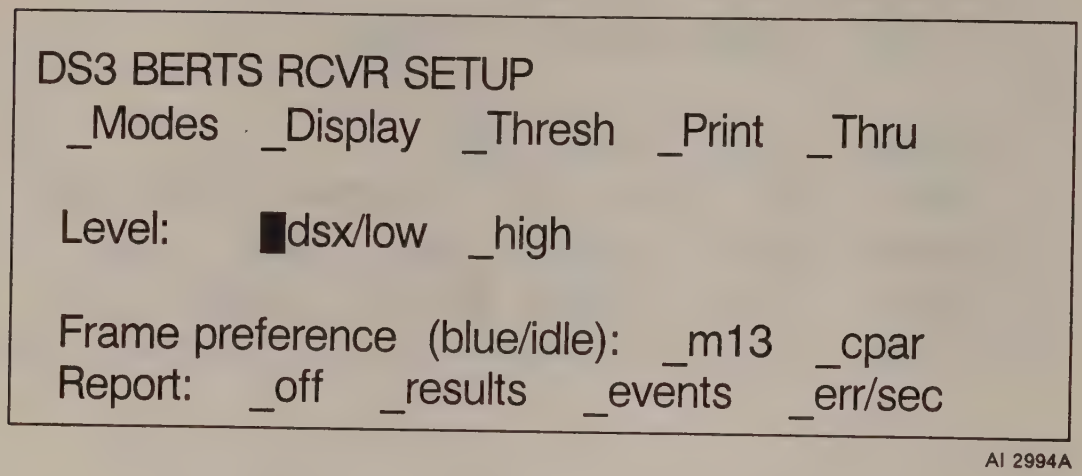


Figure 3.44. DS3 BERTS RCVR SETUP Screen

7. Check pin 3 of relay K1 for signal.

No signal at pin 3 and DS3 RCVR Level set on "dsx/low." Check buffer Q1. On front panel of analyzer, on "Level:" line, move cursor to "__high" and push ENTER. Check pin 3 of relay K1 for signal.

No signal at pin 3 and DS3 RCVR Level is set on "high," Replace K1.

Data pattern 1010 is at output pin 11 of U9. With oscilloscope, check output of U9 at pin 30 for TTL clock pulse at 44.736 MHz.

There are three possibilities: No TTL clock pulse, a TTL clock pulse at 44.736 MHz, or a TTL clock pulse at the wrong frequency.

No TTL clock pulse at pin 30 of U9. Replace chip U9.

TTL clock pulse at 44.736 MHz is at pin 30 of U9. Check for +5 volts dc at pin 28 of U9.

-5 volts at pin 28 of U9. Replace U9.

+5 volts dc at pin 28 of U9. Check U5 pin 12 for a logic zero (< +0.4 volts).

Pin 12 of U5 is a logic one (> +2.4 volts). Replace U8.

Check output of U5 at pin 58 for a 50 millisecond square wave.

Square wave at pin 58 of U5. Replace U5.

No square wave at pin 58 of U5. Check input of buffer U21, pin 9.

Square wave at pin 9 of U21. Replace U21.

No square wave at pin 9 of U21. Check real-time clock card, by running diagnostic, Section 3.3.5.

TTL clock pulse is at pin 30 of U9 but not at 44.736 MHz. Check DS3 Clock Recovery.

(1) Connect frequency counter to TP1.
(2) Move jumper to pins 1 and 2 of J18 and adjust R29 for a frequency reading of 48 MHz.
(3) Short pin 6 of U9 to -5.2 volts (pin 8); check frequency counter for a reading of 40 MHz.
(4) Move jumper back to pins 2 and 3 of J18.
(5) Apply DS3 signal to front-panel connector DS3 RX and check counter for a reading of 44.736 MHz.

Counter does not read 44.736 (clock does not lock to 44.736 MHz). Check U5, pin 12, for a logic high.

Pin 12 of U5 is not at a logic high. Check U8, pin 7, for +5 volts.

U8 pin 7 is not +5 volts. Check U8, pin 5, to be more negative than U8 pin 6.

Pin 5 of U8 is more negative than pin 6 of U8. Replace U9.

Pin 12 of U5 is at a logic high. Set oscilloscope on 100 millivolt scale, and check signal at pin 6 of U9 for a triangular sweep wave going above and below zero.

Triangular wave at pin 6 of U9. Replace U9.

No triangular wave at pin 6 of U9. Check U23 pin 7 for triangular pulse.

No triangular wave at pin 7 of U23. Check U20 pin 11 for 100 millisecond square wave.

Square wave is at pin 11 of U20. Replace U23.

Square wave is not at pin 11 of U20. Replace U10.

Triangular pulse is at pin 7 of U23. Replace Q3.

Let's review. The DS3 LOS light is still on. U9 is good, and so are the components associated with it. In this situation, other DS3 lights will be on. Go to **Step Two** or **Step Three.**

Step Two: DS3 LOS, DS3 OOF, and DS3 PATT LOSS lights are on.

First, check the framing. Here's how you do that.

1. On the front of the analyzer, on the SET UP panel, push XMTR button. Select screen will give you your choice of __DS1 BERTS or __DS3 BERTS, see Figure 3.45.

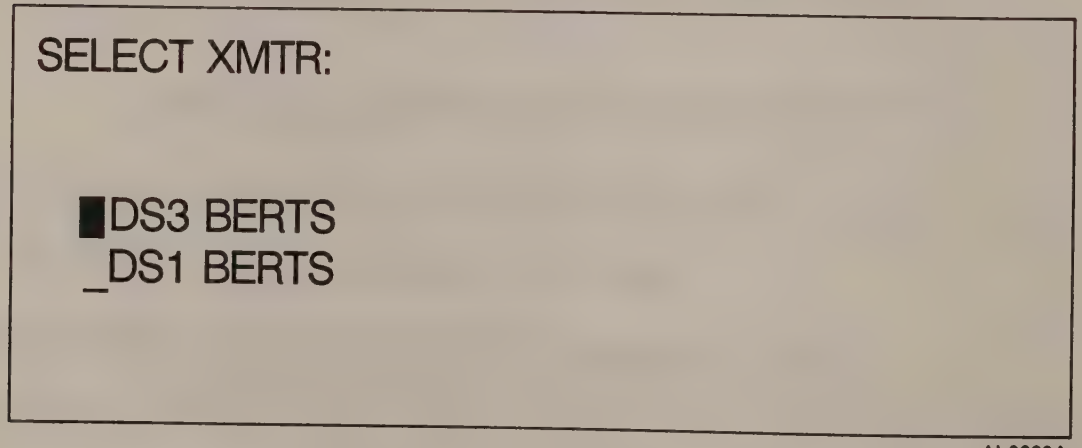


Figure 3.45. SELECT XMTR Screen

2. Move cursor to ___DS3 BERTS and push ENTER. Screen will show DS3 BERTS XMTR SETUP, see Figure 3.46.

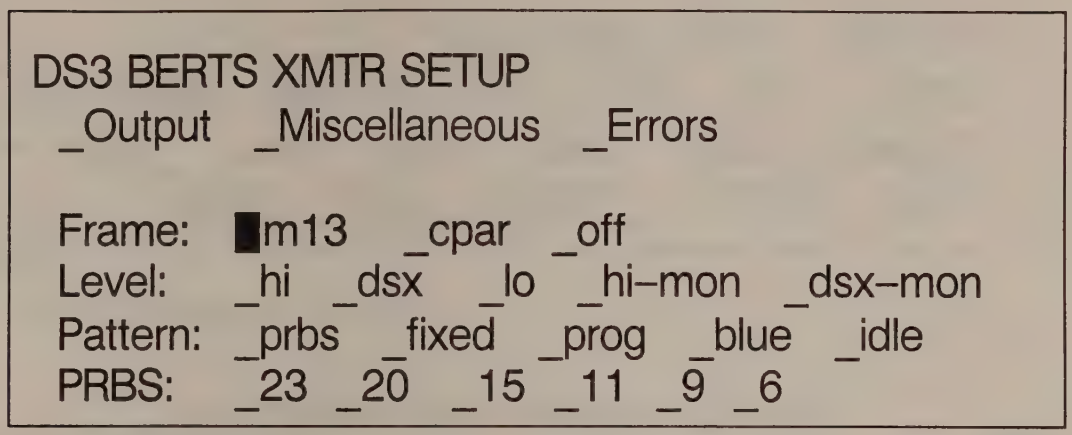


Figure 3.46. DS3 BERTS XMTR SETUP Screen

3. Use arrow key to move cursor to "___Output."

Cursor on "Frame:" line at either "m13" or "cpar," Framing is on.

Cursor on "Frame:" line is at "off," Move cursor to "___cpar" and push ENTER.

DS3 OOF and PATT LOSS lights are still on, Check that U5 is decoding properly. Here's how you do that.

1. Push EXIT and on the SELECT XMTR screen you have a choice of ___DS1 BERTS or ___DS3 BERTS. Choose ___DS3 BERTS. Push ENTER.

2. You will see a DS3 BERTS XMTR SETUP screen, see Figure 3.47.

3. On the "Pattern:" line, move cursor to "___fixed" and push ENTER.

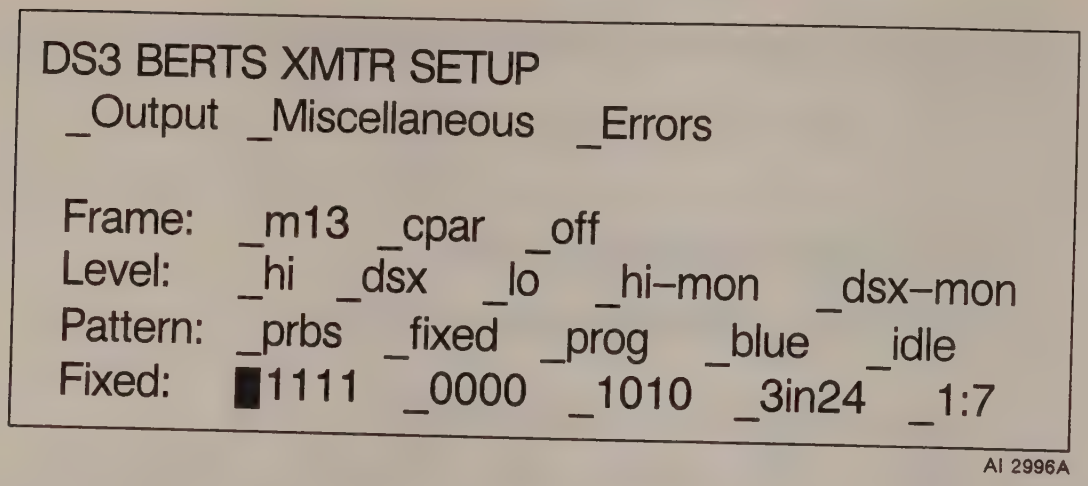


Figure 3.47. DS3 BERTS XMTR SETUP Screen

4. On the "Fixed:" line, move cursor to "__1111" and push ENTER.

OOF and PATT LOSS lights stay on. With oscilloscope, check pin 55 on U5 for an all 1s signal with an occasional (zero) framing bit. The signal looks like Figure 3.48.

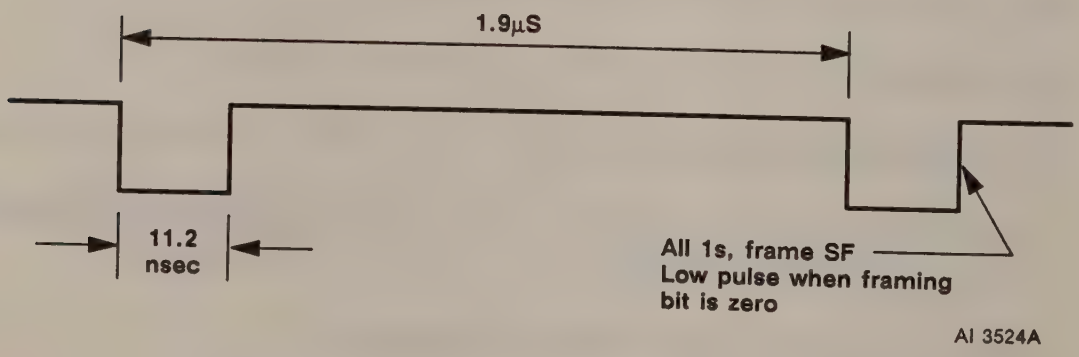


Figure 3.48. Clock Pulse With Framing Bit

Data with framing bits is at pin 55 of U5. Replace U4.

No data with framing bits at pin 55 of U5. Replace U5.

Step Three: LOS light off, OOF light off, PATT LOSS light on.

Replace U3.

All lights go off. Go to **Step Five,** Check frequency.

PATT LOSS light stays on. Replace U4.

Step Four: DS3 BLUE light off.

On the front panel of the analyzer, on the SETUP panel, push XMTR, then choose ___DS3 BERTS. You'll see DS3 BERTS XMTR SETUP screen, see Figure 3.49.

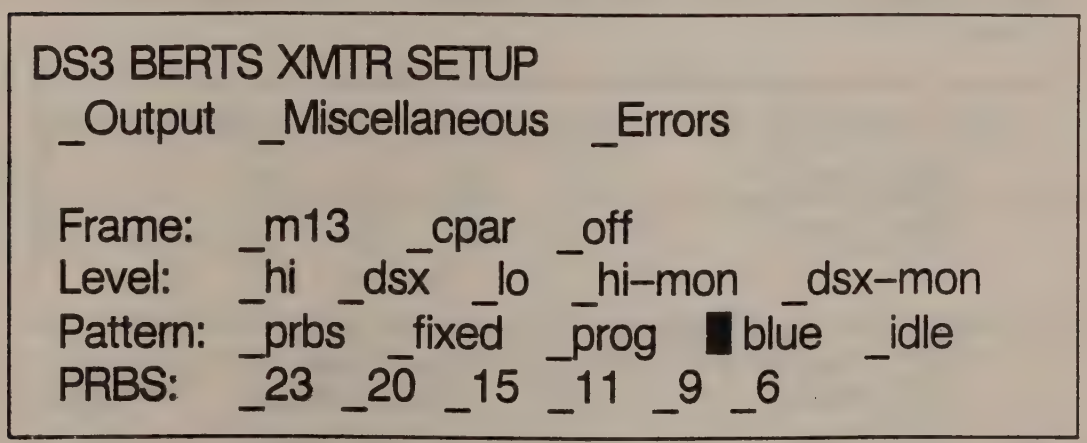


Figure 3.49. DS3 BERTS XMTR SETUP Screen

Using the arrow keys, move cursor to "__Output" and press ENTER, then move cursor to the "Pattern:" line and choose "__blue."

On the analyzer front panel, DS3 BLUE light is on. Reassemble analyzer and repeat procedures of Section 3.2 that apply to this card.

On the analyzer front panel, DS3 BLUE light is off. Replace U4.

Step Five: Check frequency.

On the front of the analyzer, on the RESULTS panel, push STATUS DS3. You'll see DS3 STATUS screen, Figure 3.50.

Move cursor to "__Freq( )." Press ENTER.

Screen shows "Freq (44.73600)," DS3 output frequency is good. Remove card extender, plug demux card back into mothercard, replace card retainers and replace analyzer top. Turn on analyzer and repeat front-panel test, Section 3.2, that apply to this card.

Screen shows "Freq (n/a)," With oscilloscope check signal on pin 11 of U13 for a square wave at CMOS level (6.176 MHz).

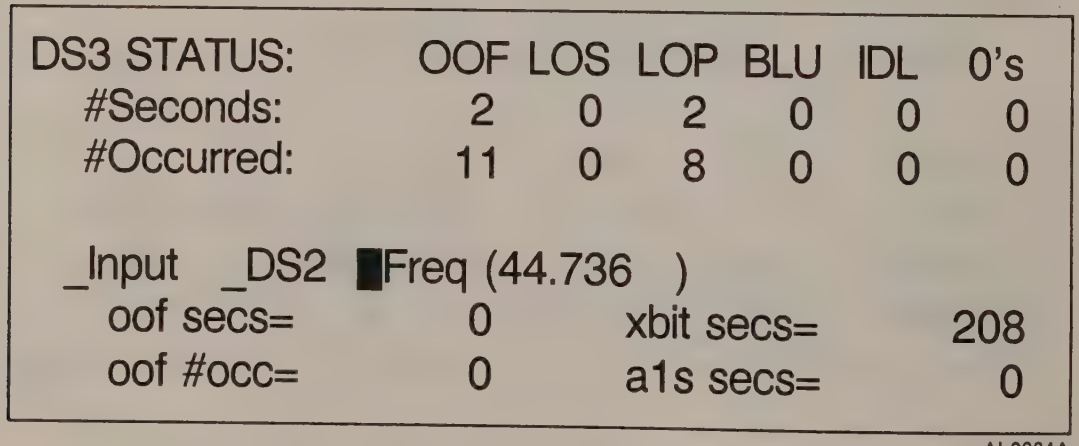


Figure 3.50. DS3 STATUS Screen

No square wave at pin 11 of U13. Check pin 7 of connector J2B for square wave.

Square wave at pin 7 of J2B. Replace U10.

Square wave is not at pin 7 of J2B. Check mothercard, Section 3.3.6.

Square wave at pin 11 of U13. Check pin 13 of U13 for 50 millisecond latch signal.

Latch signal is at pin 13 of U13. Replace U13. If still no frequency, check 50-millisecond latch signal from Real-Time Clock Card, with diagnostic test, Section 3.3.5.

No latch signal at pin 13 of U13. Replace U10 and then, if necessary, U5.

Step Six: Check DS3 to DS0 Demultiplexing.

NOTE

Analyzer does not provide a DS3 signal for this test. Plug external DS3 in front panel at DS3 RX.

1. On the front of the analyzer, on the SETUP panel, choose RCVR, then, on the RESULTS panel, choose DS1 and press ENTER.

2. Move cursor to "__Modes" and push ENTER. Your screen will be similar to DS1 BERTS RCVR SETUP page, see Figure 3.51.

3. Move cursor to the "Input source:" line, to "__demux" and push ENTER. The software program will force the DS1 A LOS light off, which means the receiver is set for demux signal input.

4. Connect external DS3 signal to DS3 RX connector on front panel.

   DS3 LOS and DS3 OOF lights go off. Go to step 5.

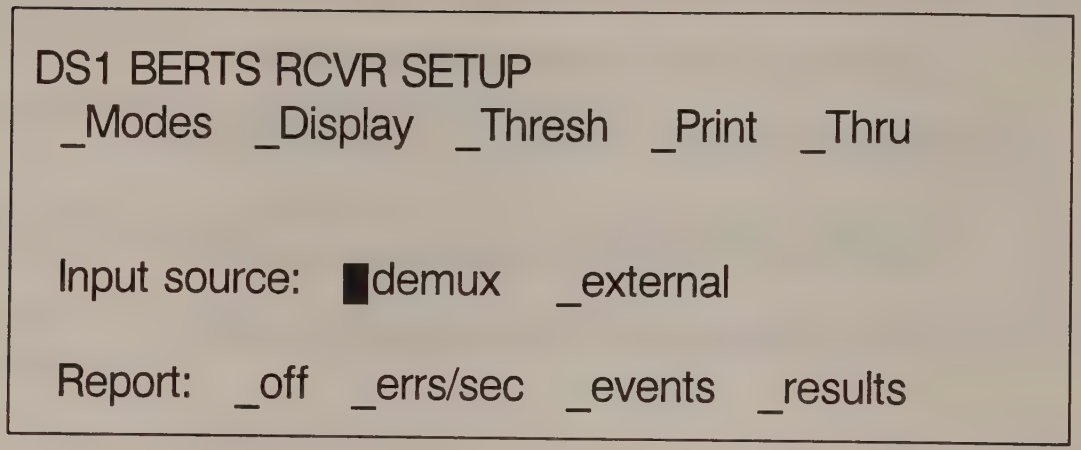


Figure 3.51. DS1 BERTS RCVR SETUP Screen

DS3 LOS and DS3 OOF lights don't go off. Check the DS3 channel, see **Step One** of this section.

DS1 OOF light goes off. DS2 framing is OK go to next step.

DS1 OOF light does not go off. Check DS2 framing. Here's how you do that.

1. On the top edge of the demux card are eight LEDs, see Figure 3.52. Check the DS2 OOF LED; it is labeled 2FL.

   LED 2FL is off. DS2 is framed. Go to step 5.

   LED 2FL is on. DS2 has not framed. Replace U2.

   LED 2FL goes off. DS2 frame is good. Go to step 5.

   LED 2FL stays on. Run diagnostic test, Section 3.3.5.

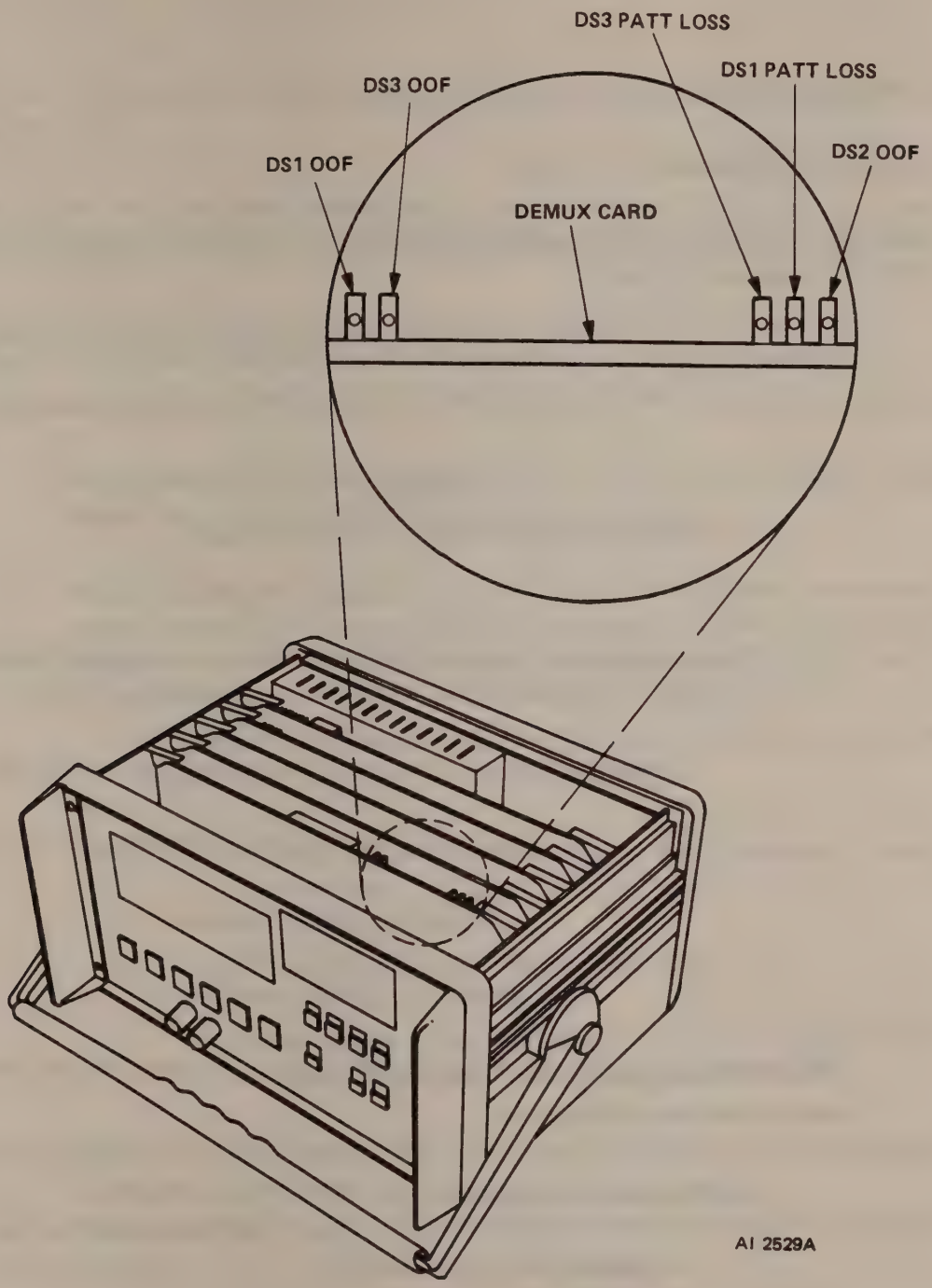


Figure 3.52. Demux LEDs

5. Check DS1 PATT LOSS light.

DS1 PATT LOSS light is off. Go to step 6.

DS1 PATT LOSS light is on. DS2 has framed, but DS1 has not. With frequency counter, check for 1.544 MHz ± 50 Hz signal at U19, pin 25.

No signal at U19, pin 25. Check output of U25, pin 8 for CMOS level 1.544 MHz clock pulse.

CAUTION

Be careful moving the crystal Y1. It is easily damaged.

No signal at U26, pin 8. Replace and recheck for signal, in this order; chip U26, transistors Q5, Q6 and Q7, and finally crystal Y1. Check for clock pulse at pin 3 of U25.

No signal at U25, pin 3. Replace U10. Check U25 pin 14 for 722 kHz signal.

No signal at U25, pin 14. Check for 1.544 MHz signal at U2, pin 30.

No signal at U2, pin 30. Replace U2.

Signal at U2, pin 30. Replace U10.

Off-frequency signal at U19, pin 25 (not 1.544 MHZ ± 50 Hz). Replace U25. With oscilloscope, check for data pulse at U19, pin 24.

No data, or gaps in data at U19, pin 24. Check for data at U2, pin 29.

No signal at U2, pin 29. Replace U2.

Signal at U2, pin 29. Replace U1, then recheck and replace U14, if necessary.

Let's review. DS1 smoother is OK, DS3 and DS2 framing is OK, but there is no demuxing DS1 to DS0 from DS3.

Check for 1.544 MHz ± 50 Hz clock pulse at U19, pin 54 and data pulses at U19 pin 55. Clock pulse should be identical to signal on U19, pin 25 and data pulses should be identical to signal on U19, pin 24.

Both signals, U19 pins 54 and 55 are present. On front panel turn VOLUME clockwise.

Noise similar to AM static. With headphones, check for static at VF OUT plug on front panel of analyzer.

Static in headphones and static on speaker. DS3 to DS0 demultiplexer is good. Reassemble analyzer and repeat procedures of Section 3.2 that apply to this card.

No static on headphone or speakers. On U41, check with an oscilloscope, in succession, signals on pins 8, 9 and 11. Here's what you should see, refer to Figure 3.53. Pin 11 has a 1.544 MHz clock pulse, pin 8 has a data pattern with transitions and pin 9 has an 8 kHz octet end marker.

Correct signals at pins 8, 9 and 11 of U41. Replace U41 and check for static at VF OUT on front panel.

Static at VF OUT. Reassemble analyzer and repeat procedures in Section 3.2 that apply to this card.

No static at VF OUT. Run diagnostic test, Section 3.3.5.

Static on speaker, but not at VF OUT. Check cable connection to J13 and to transformer T3. As a last resort, replace speaker.

No signals at U19, pins 54 and 55. Replace U19 and check for signals in pins 45 and 55 of replacement U19.

Correct signals at pins 54 and 55 of U19. Reassemble analyzer and repeat procedures in Section 3.2 that apply to this card.

No signals at pins 54 and 55 of U19. Run diagnostic test in Section 3.3.5.

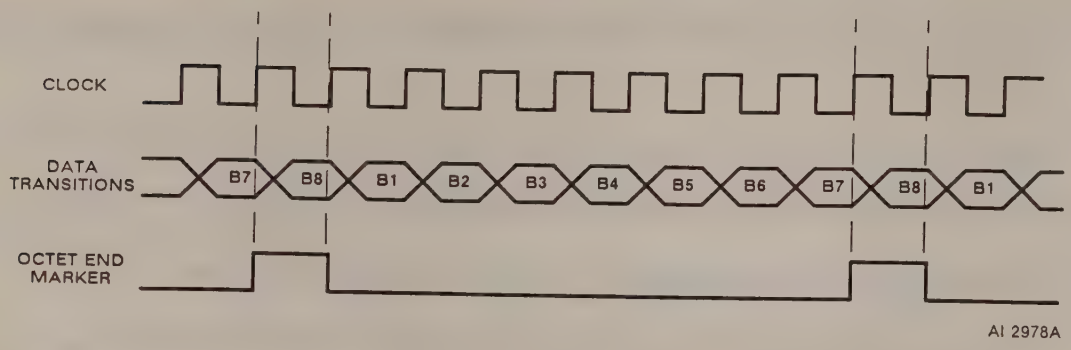


Figure 3.53. Timing Diagram

Step Seven: Check digital output.

The digital output of the demux card is checked on connector J11 which on the front panel of the analyzer is labeled DS0 OUT. With your oscilloscope check pin 8 of the DS0 OUT connector for a TTL pulse 15.6 microseconds wide and 125 milliseconds apart. This is the octet end marker, see Figure 3.53.

Octet end marker is at pin 8 of J11. Check J11, pin 7 for and 64 kHz clock (TTL level) *and* check J11 pin 6 for data transitions (TTL level). The three signals, clock, data transitions and end marker, are shown in correct juxtaposition in Figure 3.53.

Octet end marker is not at pin 8 of J11, *or* 64 kHz clock pulse is not at pin 7, *or* data transitions are not at pin 6. Check pin 10 of U40 for data, pin 7 of U40 for a clock pulse and pin 11 of U40 for octet end marker.

Any of the signals at pin 10, 7 or 11. Replace U40.

Signal missing at either pin 8, 7 or 6. Check U39, pin 9 for a high TTL level.

Signal at pin 9 of U39 is not high. Check front panel DS1 OOF light.

DS1 OOF light is out. Replace U40.

Signal at pin 9 of U39 is high. Check U39 pin 4 for data transitions and U39 pin 3 for clock pulse.

No data transitions at pin 4 of U39. Replace U18.

No clock pulse at pin 3 of U39. Check pin 1 of U38 for clock pulse.

No clock pulse at pin 1 of U38. Replace U18 and check pin 3 of U38 for logic zero.

No logic zero at pin 3 of U38. Replace U40.

Logic zero at pin 3 of U38. Replace U38.

Step Eight: Checking DS3 THRU Output.

1. On SETUP panel of analyzer, choose XMTR, choose DS3 BERTS, push ENTER, move cursor to "__Output," push ENTER, see Figure 3.54.

2. Move cursor to "Frame:" line, to "__cpar" and push ENTER. Set DS3.

3. Move cursor to "PRBS" line, to "__11" and push ENTER.

4. On front panel, connect DS3 TX1 to DS3 RX.

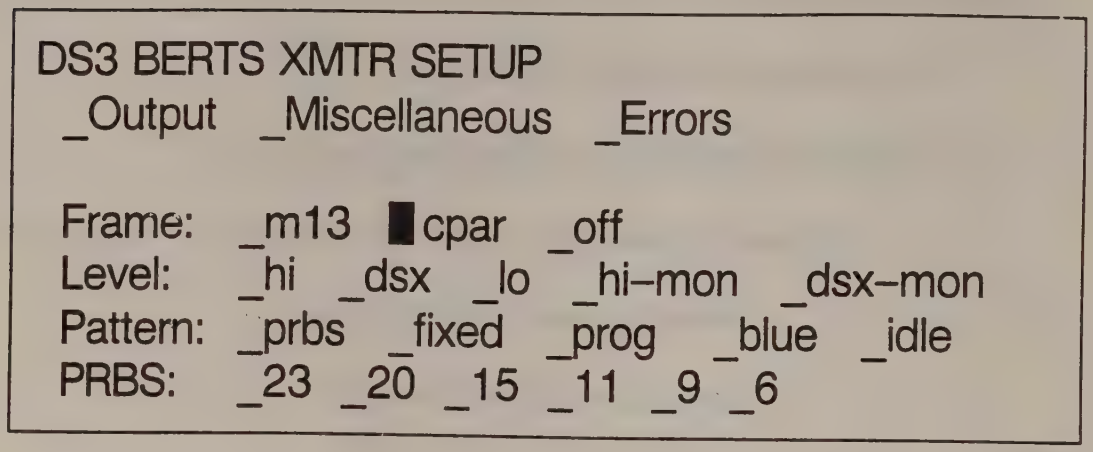


Figure 3.54. DS3 BERTS XMTR SETUP Screen

5. Connect a 75.0 ohm single-ended load to the DS3 THRU output. Connect oscilloscope across the load, and check for a 0.7 to 1.2 peak-to-peak bipolar signal.

   No signal across load. Check U5, pin 37 and 38 for signals.

   No signals at pins 37 or 38 of U5. Replace amplifier U5.

   Signals are at pins 37 or 38 of U5. Check cable between J19 and J16.

   Signals still at pins 37 or 38 of U5. Check for same signals at pins 4 and 5 of Z1.

   Pulses are at pins 4 and 5 of Z1. Replace Z1.

   Pulses are still present at pins 37 and 38 of U5. Run diagnostic test in Section 3.3.5.

This is all you can do with the demux card.

3.3.4 Signal Analysis Card

NOTE

Before you start working on the Signal Analysis Card, make sure you are using a good transmitter.

NOTE

Some components on the signal analysis card are programmed and can only be replaced by Scientific-Atlanta. They are in the parts list, Chapter 4, but are also listed here for your shopping convenience.

Reference Designator	Scientific-Atlanta Part Number
U24	0309652
U25	0309653
U26	0309654
U33	0309655
U38	0309656
U39	0309657
U22, U36	045109 (Set)

3.3.4.1 DS1 Circuit

Before you start troubleshooting the DS1 circuit, set up the DS1 transmitter for an unframed 1010 signal. Here's how you do that.

1. On the front of the analyzer, on the SET UP panel, push XMTR button. SELECT XMTR screen gives you your choice of ___DS1 BERTS or ___DS3 BERTS, see Figure 3.55.

2. Choose ___DS1 BERTS and push ENTER. Screen will now show DS1 BERTS XMTR SETUP screen, see Figure 3.56.

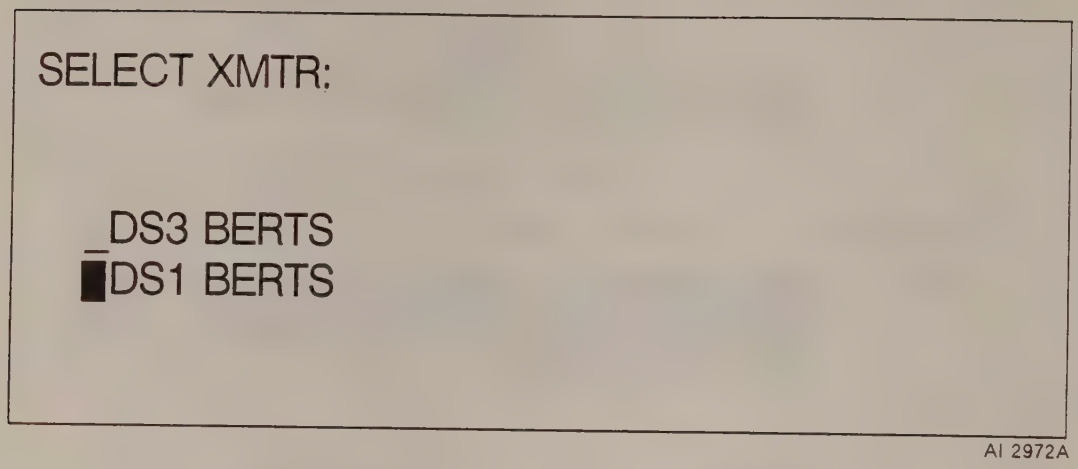


Figure 3.55. SELECT XMTR Screen

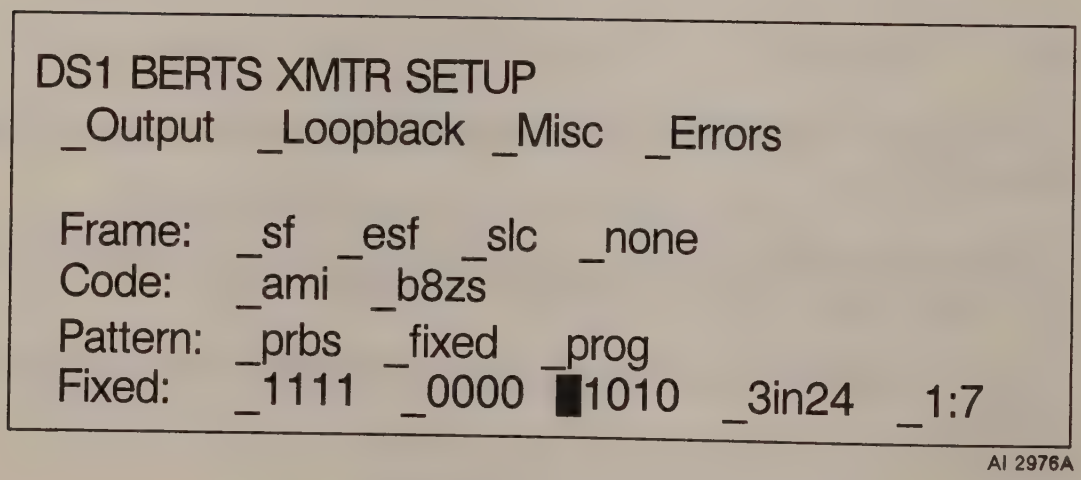


Figure 3.56. DS1 BERTS XMTR SETUP Screen

3. On "Frame:" line, move the cursor with the arrow keys to "__none" and push ENTER.

4. On the "Pattern:" line, move cursor to "__fixed" and push ENTER.

5. On the "Fixed:" line, move cursor to "__1010" and push ENTER. These settings will produce the data pattern 1010, see Figure 3.57.

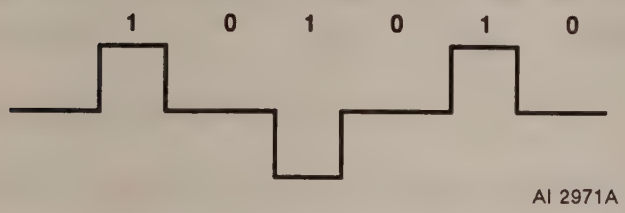


Figure 3.57. Data Pattern 1010

6. On the front panel of analyzer, on the RESULTS panel, choose AUX. You'll see a SIGNAL ANALYSIS Setup screen. Move cursor to "_Setup" and push ENTER. Now you'll see Figure 3.58.

7. Move cursor to "DS1 Level:" line at "__dsx1." Push ENTER, then EXIT, then SUMMARY. Screen will show SIGNAL ANALYSIS Summary screen, see Figure 3.59.

Now you are ready to start troubleshooting the DS1 circuit of the signal analysis card.

Step One: Check DS1 Amplitude Failure. (On "DSX1" line in Figure 3.59, there is an "f" [fail] under "AMP" and maybe an "f" under "WID" or "SYM".)

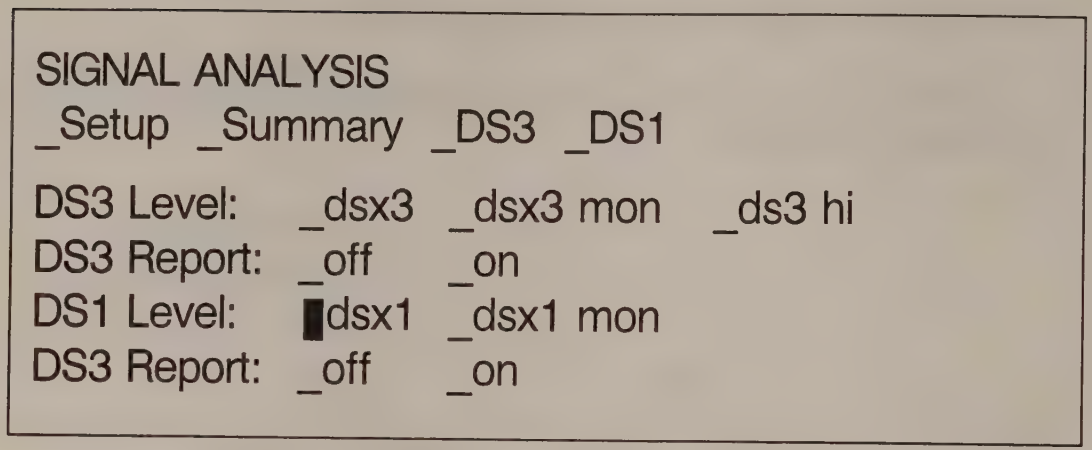


Figure 3.58. SIGNAL ANALYSIS Setup Screen

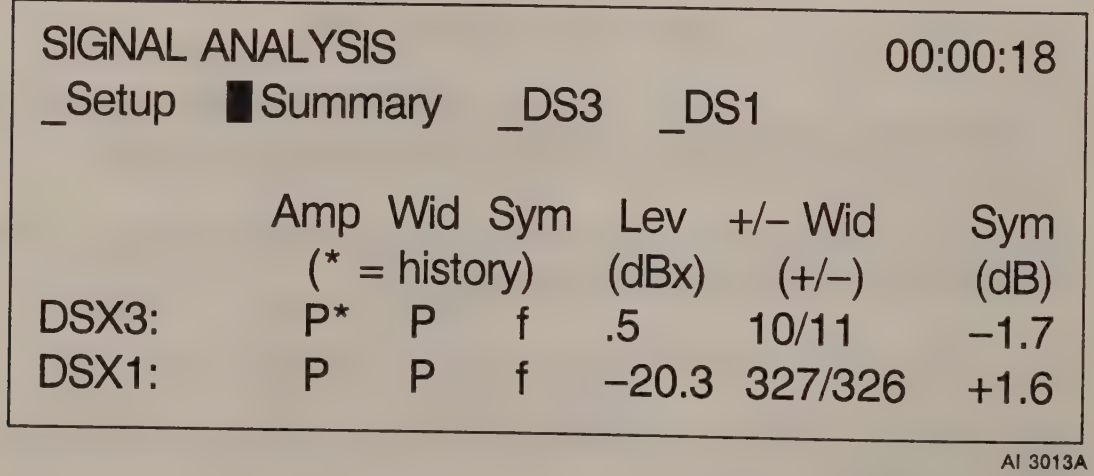


Figure 3.59. Typical SIGNAL ANALYSIS Summary Screen

NOTE

In this procedure, after replacing any component, always check the Signal Analysis Summary screen. When you have "P" under "AMP," "WID" and "SYM," you've corrected the problem.

Put the signal analysis card on the Scientific-Atlanta card extender. Have the schematic handy (Chapter 5) and refer to Figure 3.60 to locate components.

Check input of comparator U12, pin 9 for symmetrical bipolar signal with peak voltage of 0.76 volts that fits within template shown in Figure 3.61.

Distorted signal at pin 9 of U12. Go to **Step Five.**

No signal at pin 9 of U12. With oscilloscope, check across pins 1 and 2 of connector J11 for bipolar signal 3 volts peak-to-peak.

No bipolar signal across pins 1 and 2 of J11. Replace cable W6 from DS1 RX input connector to Signal Analysis card J11, see Figure 3.62.

Bipolar signal across pins 1 and 2 of connector J11. Check collector (3) of transistor Q15 for +5 volt switching signal.

No signal on collector of Q15. Check at base (2) of transistor Q15 for switching signal.

No signal at base of Q15. Replace transformer T2.

Signal at base of Q15. Replace transistor Q15.

Switching signal at collector (3) of transistor Q15. Check output of selector U5, pin 13 for switching signal.

No switching signal at output on U5. Replace U5.

Switching signal is at output of U5. Check collector (3) of transistor Q14 for switching signal.

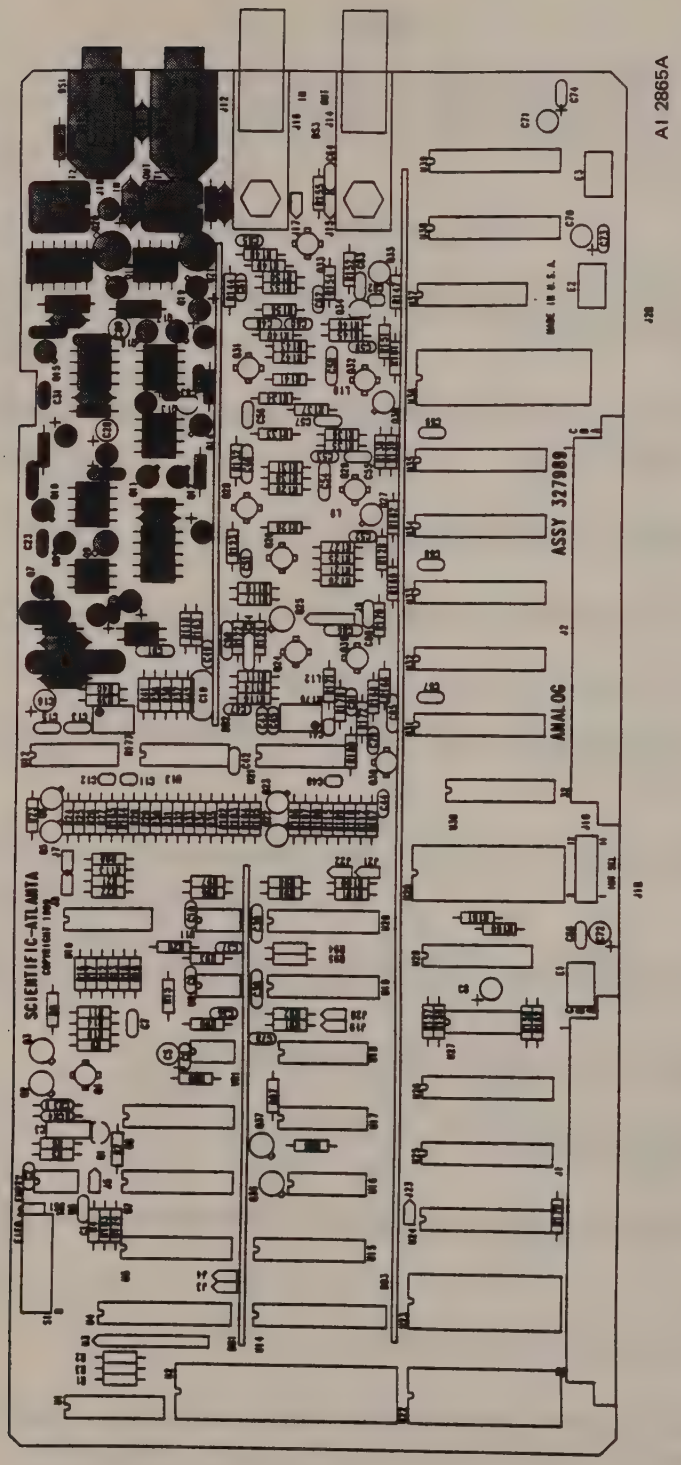


Figure 3.60. DS1 Components of Signal Analysis Card

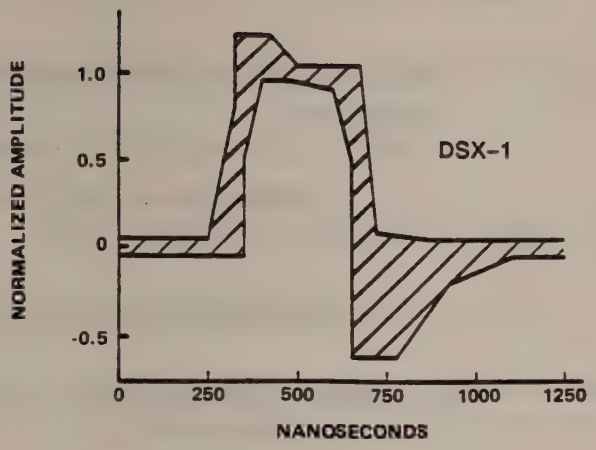


Figure 3.61. DS1 Transmitter Bipolar Signal

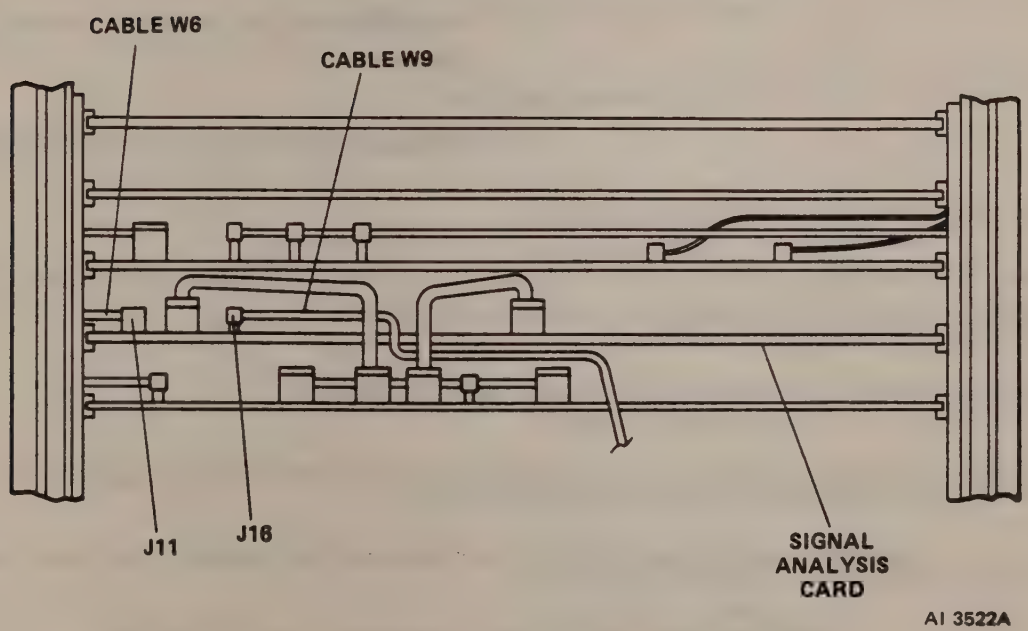


Figure 3.62. Signal Analysis Card Cables

No switching signal at collector of Q14. Replace Q14. Then, if necessary, replace Q13 and Q15, in that order and check collector (3) of transistor Q10 for switching signal.

No switching signal at collector of Q10. Check base (2) of Q10 for switching signal.

No switching signal at base of Q10. Replace coupling capacitor C31.

Switching signal is at base of Q10. Replace Q10.

Switching signal at collector of Q10. Check collector (3) of transistor Q7 for switching signal.

No switching signal at collector of Q7. Check base (2) of Q7 for switching signal.

No switching signal at base of Q7. Replace coupling capacitor C23.

Switching signal at base of Q7. Replace transistor Q7.

Step Two: Check DS1 Distortion. You have a bipolar signal at input of U12, pin 9, but it is distorted and on the SIGNAL ANALYSIS Summary screen you have one or more "f"s.

Check the collector (3) of transistor Q15 for bipolar signal, see Figure 3.61.

Signal not distorted at collector of Q15. Check collector (3) of transistor Q10 for bipolar signal.

Signal not distorted at output of Q10. Check collector (3) of transistor Q7 for bipolar signal.

Signal not distorted at output of Q7. Replace L2, L3, C17, C18, C20.

Signal distorted at output of Q7. Check base (2) of Q7 for bipolar signal.

Signal distorted at base of Q7. Replace coupling capacitor C23.

Signal not distorted at base of Q7. Replace Q7.

Signal distorted at output of Q10. Check base (2) of Q10 for bipolar signal.

Signal not distorted at base of Q10. Replace Q10.

Signal still distorted at base of Q10. Check selector U5, pin 18 for a logic high.

No voltage at pin 18 of U5. Replace U5.

Voltage is at pin 18 of U5. On the front of the analyzer, on the RESULTS panel, push AUX to get a SIGNAL ANALYSIS Setup screen, see Figure 3.58. Move cursor to "DS1 Level:".

With oscilloscope on collector of Q10, move cursor back and forth between "dsx1" and "dsx1 mon" and check for +5 volts dc with cursor in "dsx1 mon" position and 0 volts with cursor in "dsx1" position.

No voltage at collector of Q10. Check for voltage at collector (3) of Q11.

No voltage at collector of Q11. Check for voltage on collector (3) of Q12.

No voltage at collector of Q12. Replace Q12.

Voltage at collector of Q11. Replace capacitor C24.

Voltage at collector of Q10. Check summary page for "f"s.

Still have one or more "f"s on summary page. Check collector (3) of transistor Q15.

Signal distorted at collector (3) of Q15. Check selector U5, pin 18 for +5 volts dc.

No voltage at pin 18 of U5. Replace U5.

Voltage at pin 18 of U5. With oscilloscope at collector of Q15, move screen cursor back and forth between "dsx1" and "dsx1 mon" and check for +5 volts dc with cursor in "dsx1 mon" position and 0 volts with cursor in "dsx1" position.

No signal at collector of Q15. Check for voltage at collector (3) of Q16.

No voltage at collector of Q16. Check for voltage at collector (3) of Q17.

No voltage at collector of Q17. Replace Q17.

Voltage at collector of Q17. Replace Q16.

Voltage at collector of Q16. Replace coupling capacitor C32.

This is all you can do with the DS1 channel of the signal analysis card. If you still have "f"s on the summary screen, run diagnostic test in Section 3.3.5.

3.3.4.2 DS3 Circuit

Before you start troubleshooting the DS3 circuit, set up the DS3 transmitter for an unframed 1010 signal. Here's how you do that.

1. On the front of the analyzer, on the SET UP panel, push XMTR button. Screen gives you your choice of __DS1 BERTS or __DS3 BERTS, see Figure 3.63.

2. Choose __DS3 BERTS and push ENTER. Screen will now show DS3 BERTS XMTR SETUP screen, see Figure 3.64.

3. On "Frame:" line, move the cursor with the arrow keys to "__off" and push ENTER.

4. On the "Pattern:" line, move cursor to "__fixed" and push ENTER.

5. On the "Fixed:" line, move cursor to "__1010" and push ENTER. These settings will produce the data pattern 1010, see Figure 3.65.

6. On the front panel of analyzer, on the RESULTS panel, choose AUX. You'll see a SIGNAL ANALYSIS Setup screen. Move cursor to "__Setup" and push ENTER. Now you'll see Figure 3.66.

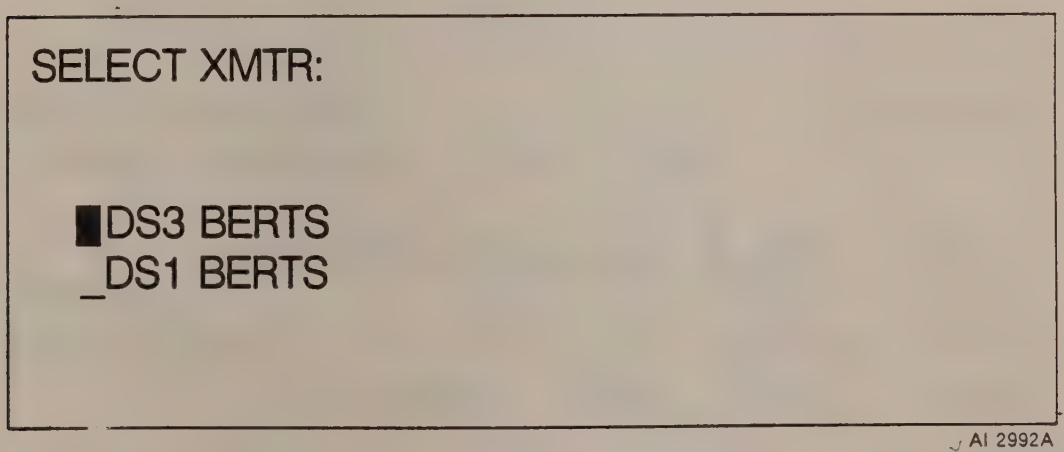


Figure 3.63. SELECT XMTR Screen

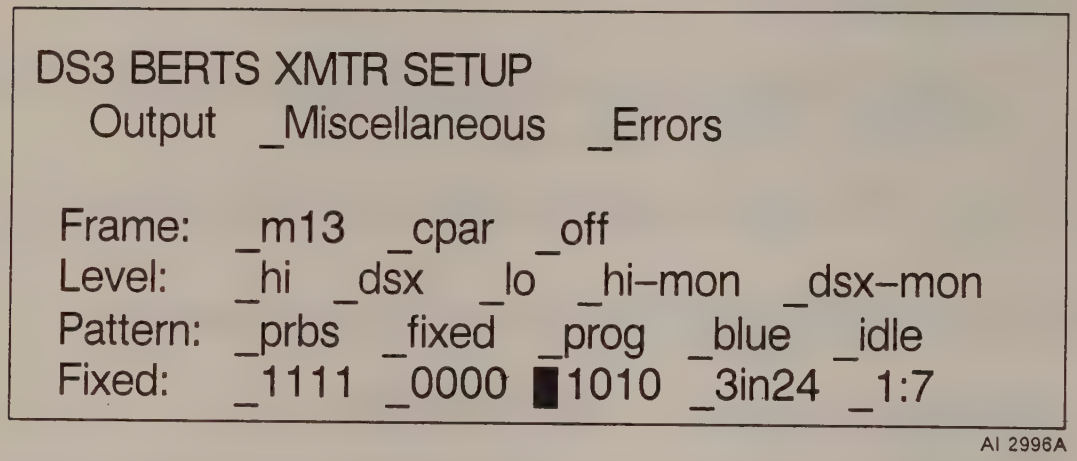


Figure 3.64. DS3 BERTS XMTR SETUP Screen

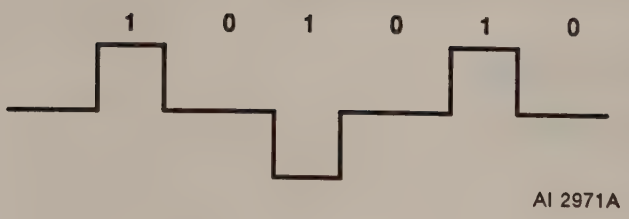


Figure 3.65. Data Pattern 1010

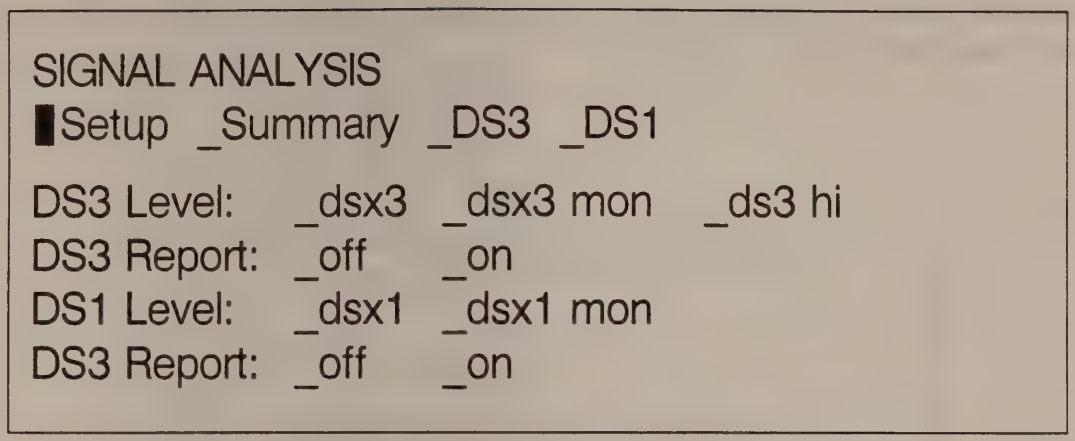


Figure 3.66. SIGNAL ANALYSIS Setup Screen

7. Move cursor to "DS3 Level:" line at "__dsx3. Push ENTER, then EXIT, then SUMMARY. Screen will show SIGNAL ANALYSIS Summary screen, see Figure 3.67.

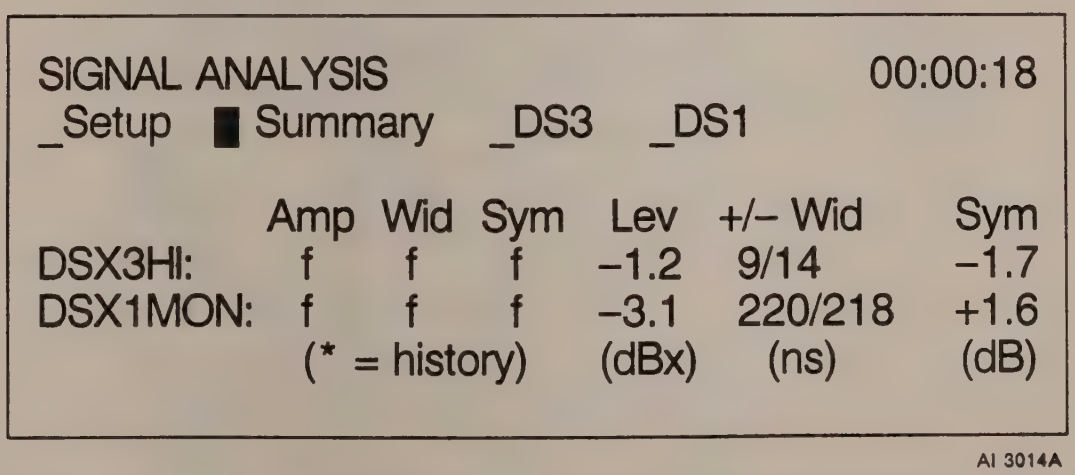


Figure 3.67. Typical SIGNAL ANALYSIS Summary Screen

Now you are ready to start troubleshooting the DS3 circuit of the signal analysis card.

Step One: Check DS3 Amplitude Failure. On the "DSX3HI" line, there is "f" [fail] under "AMP" and maybe an "f" under "WID" or "SYM," see Figure 3.67.

NOTE

The transmitter card must be a good one. If you haven't checked the transmitter card, do it now.

NOTE

In this procedure, after replacing any component, always check the Signal Analysis Summary screen. When you have "P" under "AMP," "WID" and "SYM," you've corrected the problem.

Put the signal analysis card on the Scientific-Atlanta card extender. Have the schematic handy (Chapter 5) and refer to Figure 3.68 to locate components.

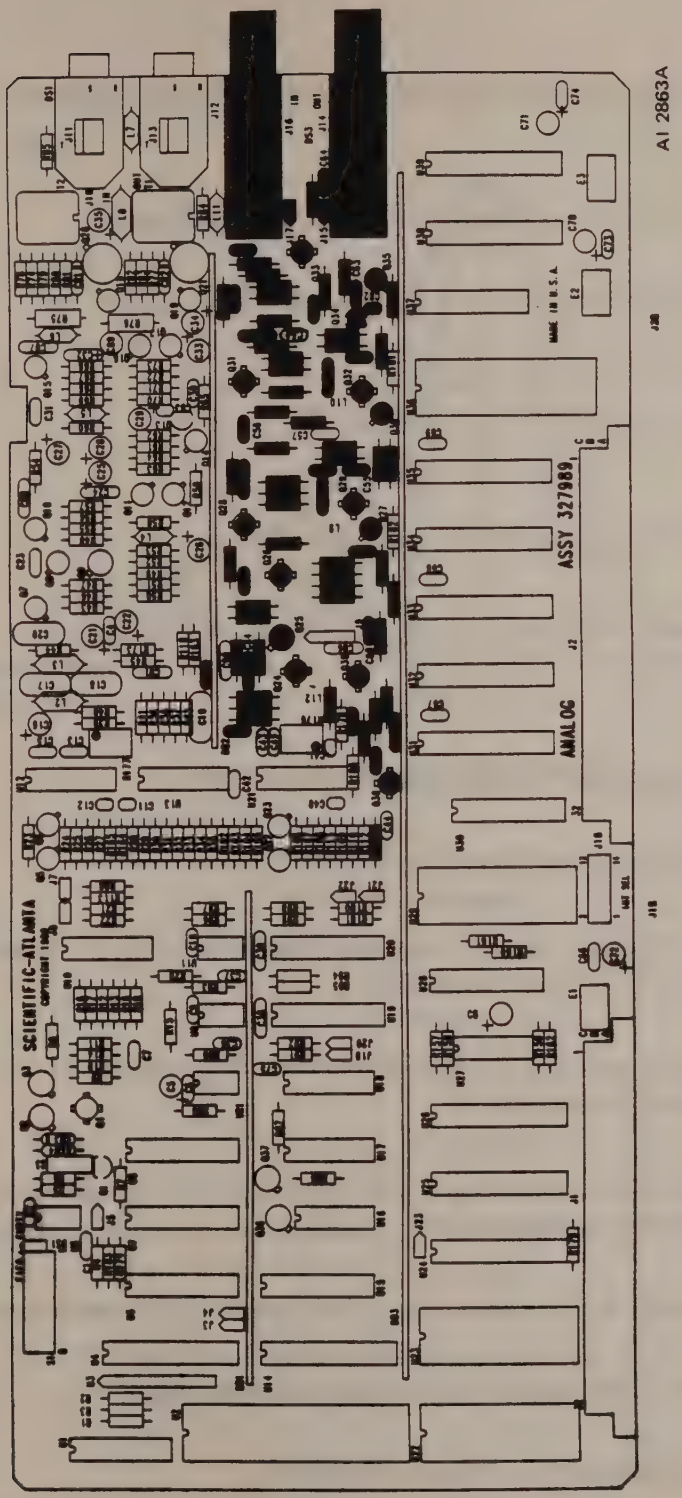


Figure 3.68. DS3 Components of Signal Analysis Card

Check input of comparator U21, pin 9 for symmetrical bipolar signal with peak voltage of 0.24 volts that fits within template, see Figure 3.69.

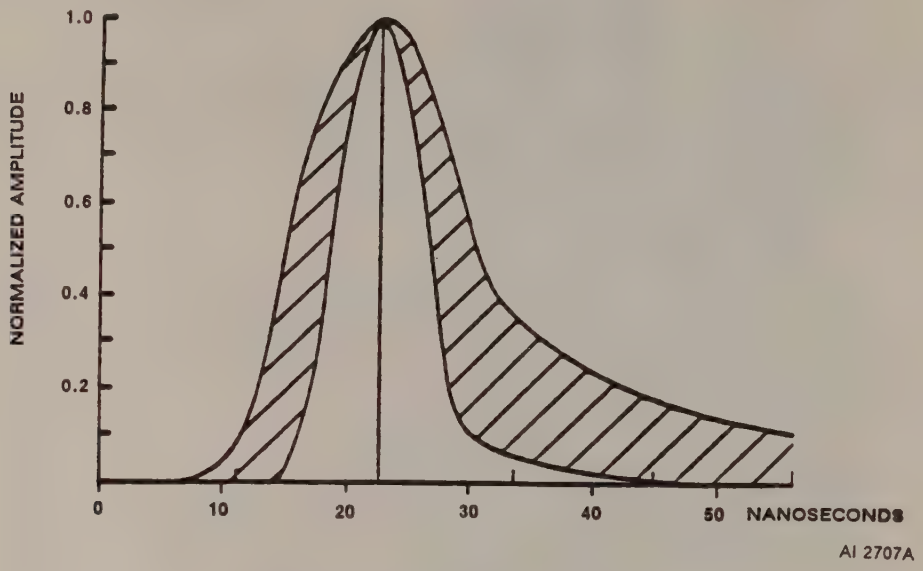


Figure 3.69. DS3 Bipolar Signal

Distorted signal at pin 8 of U21. Go to **Step Two**.

No signal at pin 9 of U21. With oscilloscope, check across pins 1 and 2 of connector J17 for bipolar signal with 3 volts peak voltage.

No bipolar signal across pins 1 and 2 of J17. Replace cable W9, from connector J16 on the signal analysis card to the front panel, see Figure 3.62.

Bipolar signal across pins 1 and 2 of connector J17. At this stage you have a signal coming into the DS3 section, but nothing going out. Check collector (1) of transistor Q31 for +5 volt switching signal.

No signal at collector of Q31. Check at base (3) of transistor Q31 for switching signal.

No signal at base of Q31. Replace coupling capacitor C65.

Signal is at base of Q31. Replace transistor Q31.

Switching signal at collector (1) of transistor Q31. Check output of selector U5, pin 19 for switching signal.

No switching signal at output on U5, pin 19. Replace U5.

Switching signal at output of U5. Check collector (3) of transistor Q35 for switching signal.

No switching signal at collector of Q35. Replace Q35. Then, if necessary, replace Q34 and Q31, in that order and check collector (1) of transistor Q28 for switching signal.

No switching signal at collector of Q28. Check base (3) of Q28 for switching signal.

No switching signal at base of Q28. Replace coupling capacitor C55.

Switching pulse is at base of Q28. Replace Q28.

Switching signal at collector of Q28. Check collector (1) of transistor Q24 for switching signal.

No switching signal at collector of Q24. Check base (3) of Q24 for switching signal.

No switching signal at base of Q24. Replace coupling capacitor C51.

Switching signal at base of Q24. Replace transistor Q24.

Step Two: Check DS3 Distortion. You have a bipolar signal at input of U21, pin 9, but it is distorted and on the SIGNAL ANALYSIS Summary screen you have one or more "f"s.

Check the collector (1) of transistor Q31 for bipolar signal, see Figure 3.69.

Signal not distorted at collector of Q31. Check collector (1) of transistor Q28 for bipolar signal.

Signal not distorted at collector of Q28. Check collector (1) of transistor Q24 for bipolar signal.

Signal not distorted at collector of Q24. Check base (3) of transistor Q39.

Signal not distorted at base of Q39. Replace transistor Q39 and coupling capacitor C81.

Signal distorted at collector of Q24. Check base (3) of transistor Q24 for bipolar signal.

Signal distorted at base of transistor Q24. Replace coupling capacitor C51.

Signal not distorted at base of transistor Q24. Replace transistor Q24.

Signal distorted at collector of Q28. Check base (3) of transistor Q28 for bipolar signal.

Signal not distorted at base of transistor Q28. Replace Q28.

Signal distorted at base of transistor Q28. Replace coupling capacitor C58 and check selector U5, pin 18 for +5 volts dc.

No voltage at pin 18 of U5. Check U21, pin 8 for bipolar signal.

Distorted bipolar signal still at U21, pin 8. Replace signal analysis card.

Voltage is at pin 18 of U5. On the front of the analyzer, on the RESULTS panel, push AUX to get SIGNAL ANALYSIS SETUP screen, see Figure 3.66. Move cursor to "DS3 Level:".

With oscilloscope at collector of Q28, move cursor back and forth between "dsx3"and "dsx3 mon" and check for +5 volts dc with cursor in "dsx3 mon" position and 0 volts with cursor in "dsx3" position.

No voltage at collector of Q28. Check for voltage at collector (3) of Q29.

No voltage at collector of Q29. Check for voltage at collector (3) of Q27.

No voltage at collector of Q27. Replace Q27.

Voltage at collector of Q27. Replace Q29.

Voltage at collector of Q29. Replace coupling capacitor C54.

Signal distorted at collector (1) of Q31. Check selector U5, pin 18 for +5 volts dc.

No voltage at pin 18 of U5. Check U21, pin 8 for bipolar signal.

Distorted bipolar signal at U21, pin 8. Replace signal analysis card.

Voltage is at pin 18 of U5. On the front of the analyzer, on the RESULTS panel, push AUX to get a SIGNAL ANALYSIS Setup screen, see Figure 3.66. Move cursor to "DS3 Level:."

With oscilloscope on collector of Q31, move cursor back and forth between "dsx3" and "dsx3 mon" and check for +5 volts dc with cursor in "dsx3 mon" position and 0 volts with cursor in "dsx3" position.

No voltage on collector of Q31. Check for voltage on collector (3) of Q32.

No voltage on collector of Q32. Check for voltage on collector (3) of Q30.

No voltage on collector of Q30. Replace Q30.

Voltage on collector of Q30. Replace Q32.

Voltage on collector of Q32. Replace coupling capacitor C58.

This is all you can do to the signal analysis card. Still have "f" on the summary screen? Run the diagnostic test, Section 3.3.5.

3.3.5 Diagnostic Test

CAUTION

**Always turn the analyzer power off when changing cards.
Always.**

The results of the diagnostic test can be read in three different ways.

First, you can read the front panel of the AT 9500. Unless the analyzer malfunction you are looking for keeps the front panel off, tests that fail are shown on the front-panel screen, like this:

TEST<test number> - <FAIL><description>

Only tests that fail are shown; and, there is only room to list five tests, so what you will see will be the last five failures. Earlier failures are scrolled off the screen.

However, when tests 0 through 9 fail, the sequence stops. When tests 10 through 29 fail, the sequence pauses long enough for you to make of a note of which test failed. The sequence of 29 tests only takes about two minutes, so if you miss something, you can always run it again.

Second, you can read the CPU LEDs. These are on the left-hand edge of the CPU card, as you face the front of the analyzer, see Figure 3.70.

These eight LEDs give you binary readout, with the least significant bit on the far right, and the most significant bit the seventh LED from the right. The LED on the far left, the eighth one, is the pass/fail light.

There are 29 tests, and when a test fails, the pass/fail LED lights, and the test sequence pauses, giving you time to record the LED light pattern.

Figure 3.71 links the CPU LED pattern and the test number. A "one" means the LED is on; a "zero" means it is off.

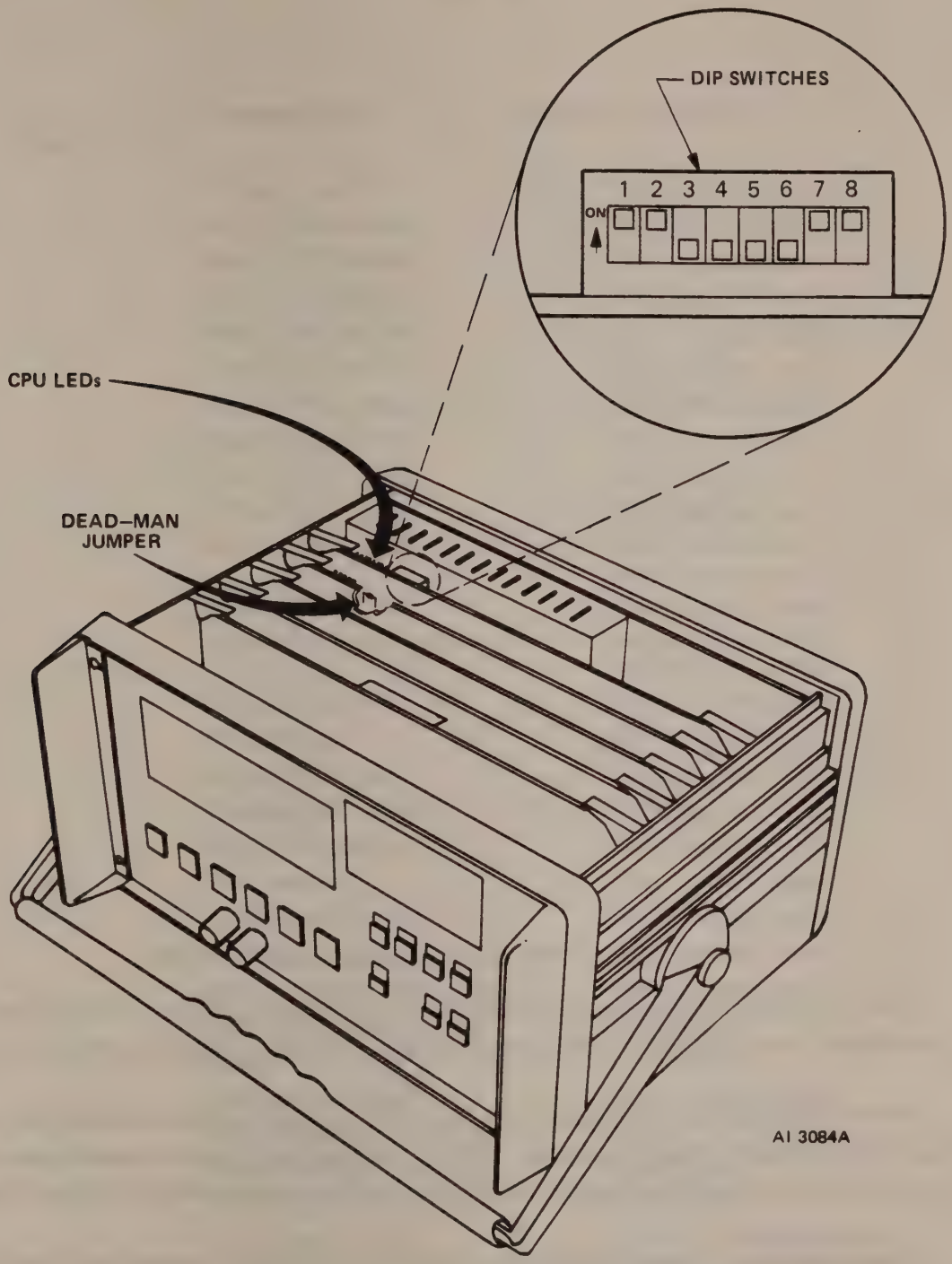


Figure 3.70. CPU LEDs and Dip Switches

CPU LED Pattern	Test Number
0 0 0 0 0 0 0	0
0 0 0 0 0 0 1	1
0 0 0 0 0 1 0	2
0 0 0 0 0 1 1	3
0 0 0 0 1 0 0	4
0 0 0 0 1 0 1	5
0 0 0 0 1 1 0	6
0 0 0 0 1 1 1	7
0 0 0 1 0 0 0	8
0 0 0 1 0 0 1	9
0 0 0 1 0 1 0	10
0 0 0 1 0 1 1	11
0 0 0 1 1 0 0	12
0 0 0 1 1 0 1	13
0 0 0 1 1 1 0	14
0 0 0 1 1 1 1	15
0 0 1 0 0 0 0	16
0 0 1 0 0 0 1	17
0 0 1 0 0 1 0	18
0 0 1 0 0 1 1	19
0 0 1 0 1 0 1	21
0 0 1 0 1 1 0	22
0 0 1 0 1 1 1	23
0 0 1 1 0 0 0	24
0 0 1 1 0 0 1	25
0 0 1 1 0 1 0	26
0 0 1 1 0 1 1	27
0 0 1 1 1 0 0	28
0 0 1 1 1 0 1	29

Figure 3.71. CPU LED Sequence/Diagnostic Test

When a test fails, the diagnostic sequence either stops or pauses, giving you time to note the LED sequence. From Figure 3.72 you can identify the failed test and proceed to the germane troubleshooting procedure.

After the 29th step, the sequence pauses. With the "dead-man" jumper on the real-time clock in place, see Figure 3.70, the diagnostic sequence starts over. With the "dead-man" jumper out, the diagnostic sequence just stops. To re-run the diagnostic, either turn the analyzer off and then on, or replace the "dead-man" jumper.

Third, you can read the terminal through the serial port. There is a 5-pin connector on the rear panel of the analyzer labeled COM1, see Figure 3.73.

Test Number	Description	Comments
0	Refresh set and test	Failure: sequence stops
1	Bank 0 CPU RAM test	Failure: sequence stops
2	Bank 1 CPU RAM test	Failure: sequence stops
3	Bank 2 CPU RAM test	Failure: sequence stops
4	Bank 3 CPU RAM test	Failure: sequence stops
5	Bank 4 CPU RAM test	Failure: sequence stops
6	Bank 5 CPU RAM test	Failure: sequence stops
7	Bank 6 CPU RAM test	Failure: sequence stops
8	Bank 7 CPU RAM test	Failure: sequence stops
9	I/O bus test	Failure: sequence stops
10	Serial interface chip set	Failure: sequence stops Pass: reports to serial port
11	Front-panel LCD test	Failure: sequence pauses
12	Output CPU ROM checksums	Compare against labels on U2, U3, U4 and U5.
13	RTC clock chip test	Failure: sequence pauses
14	GPIB chip test	Failure: sequence pauses
15	Interrupt controller	Failure: sequence pauses
16	Front-panel switch & LED	Will fail; ignore
17	Front-panel interrupt	Will fail; ignore
18	Serial interrupt	Failure: sequence pauses
19	10-millisecond interrupt	Failure: sequence pauses
20	20-millisecond interrupt	Failure: sequence pauses
21	Direct Memory Access Controller	Failure: sequence pauses
22	Serial Direct Memory Access	Will fail; ignore
23	Beeper	Beeps for pass
24	NVRAM 0A0000 test	Failure; sequence pauses
25	NVRAM 0B0000 test (bank 0)	Will fail
26	NVRAM 0B0000 test (bank 1)	Will fail: ignore
27	NVRAM 0B0000 test (bank 2)	Will fail: ignore
28	Read application cards	Tests and shows checksums for Application Card EPROMS
29	RTC dynamic RAM test	Will fail; ignore

Figure 3.72. Diagnostic Test List

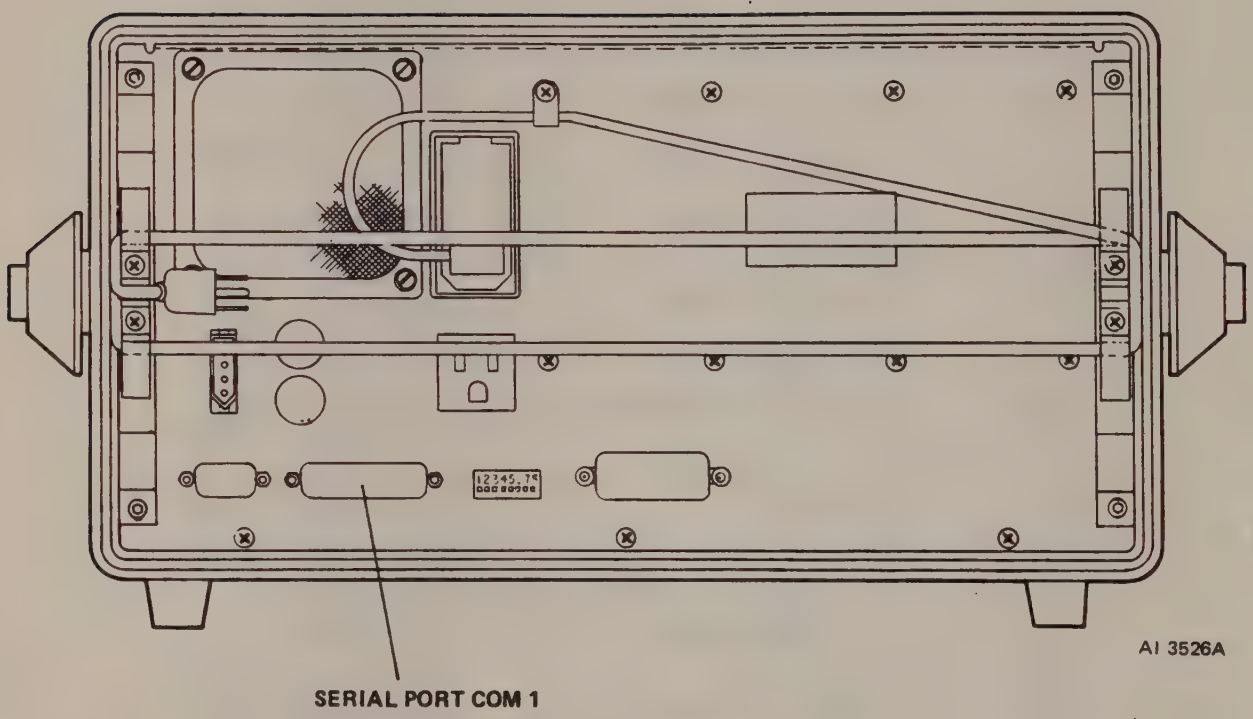


Figure 3.73. Rear Panel

Set the serial terminal like this: 9600 baud, 8 data bits, 1 stop bit, no parity. There is no software (XON, XOFF) or hardware (RTS< CTS) flow-control on the diagnostic program.

Tests that pass are written to the terminal, so a listing of successful tests are either printed or appear on the CRT, or both, depending on what you have on the serial port.

Figure 3.72 lists a description of the 29 diagnostic tests.

Step One: Turn on the analyzer.

Sign-on screen, see Figure 3.74, appears followed by a summary screen, see Figure 3.75. Go to **Step Two.**

Sign-on screen does not appear. Go to **Step Two.**

Sign-on screen appears, but summary screen does not. Check the clock circuit on the real-time clock card. Here's how you do that:

On the front of the analyzer, on the TEST panel, push TIME. LED in the TIME switch lights, and TIME screen appears, see Figure 3.76. Readout in upper right of TIME screen gives date and time. Check that clock is running.

Clock is running. Go to **Step Two.**

Clock is not running. Select SUMMARY screen, then return to TIME screen and check that clock is still running.

Clock has reset to zero and is running. Check clock battery. Here's how you do that:

NOTE

The AT 9500 Analyzer will work without a charged battery, but each time you turn the analyzer on, you'll have to reset the clock. Also, the historical data will not be saved.

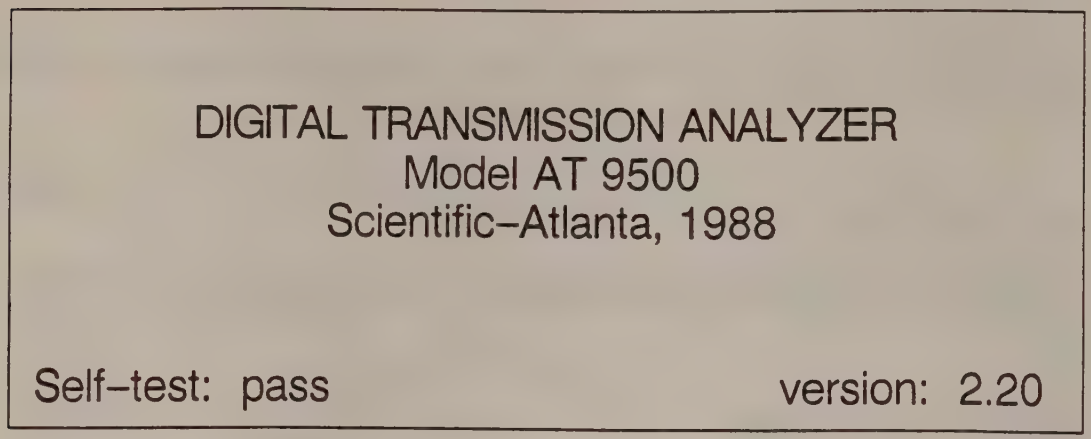


Figure 3.74. Typical Sign-on Screen

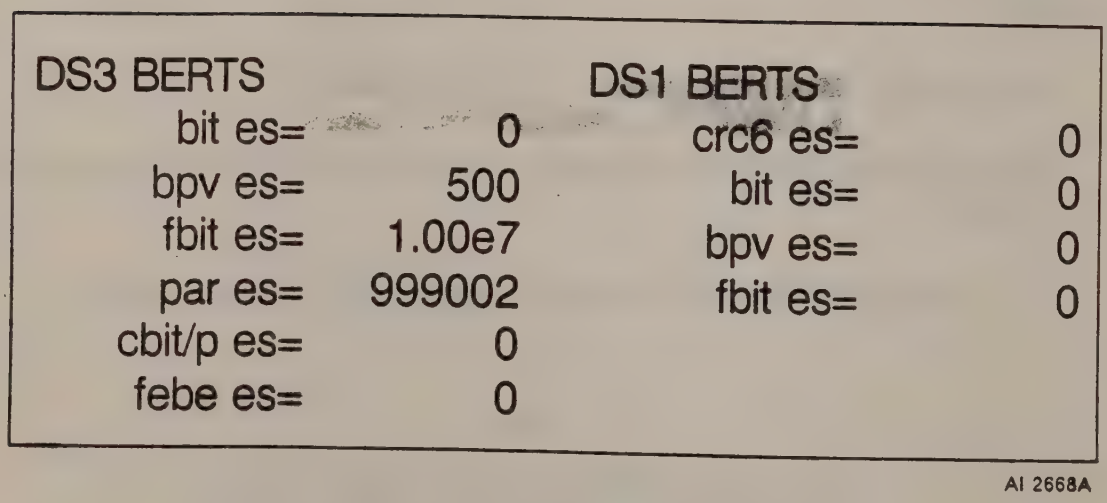
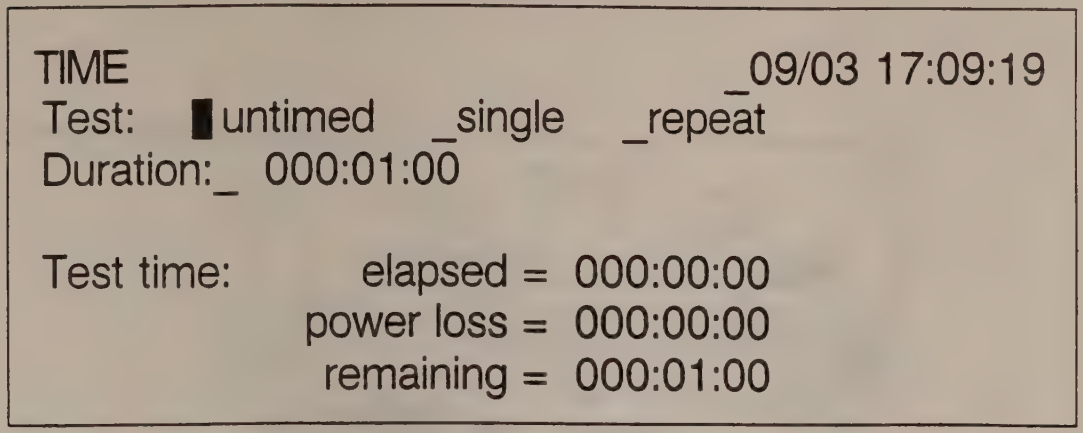


Figure 3.75. Typical Summary Screen



AI 3006A

Figure 3.76. Typical TIME Screen

Put real-time clock card on Scientific-Atlanta card extender. Have the schematic handy (Chapter 5) and refer to Figure 3.77 to locate components.

Check battery BT1 for 3.5 volts.

Battery checks 3.0 volts or more. Make sure jumper P5 is making good contact, and check output of U28, pin 5 for >3.0 volts.

Voltage at output of U28, pin 5, is approximately the same as battery voltage. Check output of U28, pin 2 for >3.5 volts.

Voltage at pin 2 of U28 less than 3.5 volts. Replace Q3.

Voltage at output of U28, pin 5, is less than 3.0 volts. Replace U28.

Battery checks <3.5 volts. Take jumper P5 out, replace battery, replace jumper P5, and remeasure battery voltage.

New battery checks <3.0 volts. Go to **Step Two.**

New battery checks >3.0 volts. Replace Q2, recheck charge, then replace Q1 if necessary.

Take RTC card off card extender, remove card extender, plug RTC card back in mothercard. Now that you are sure the battery power circuit is OK, go to **Step Two.**

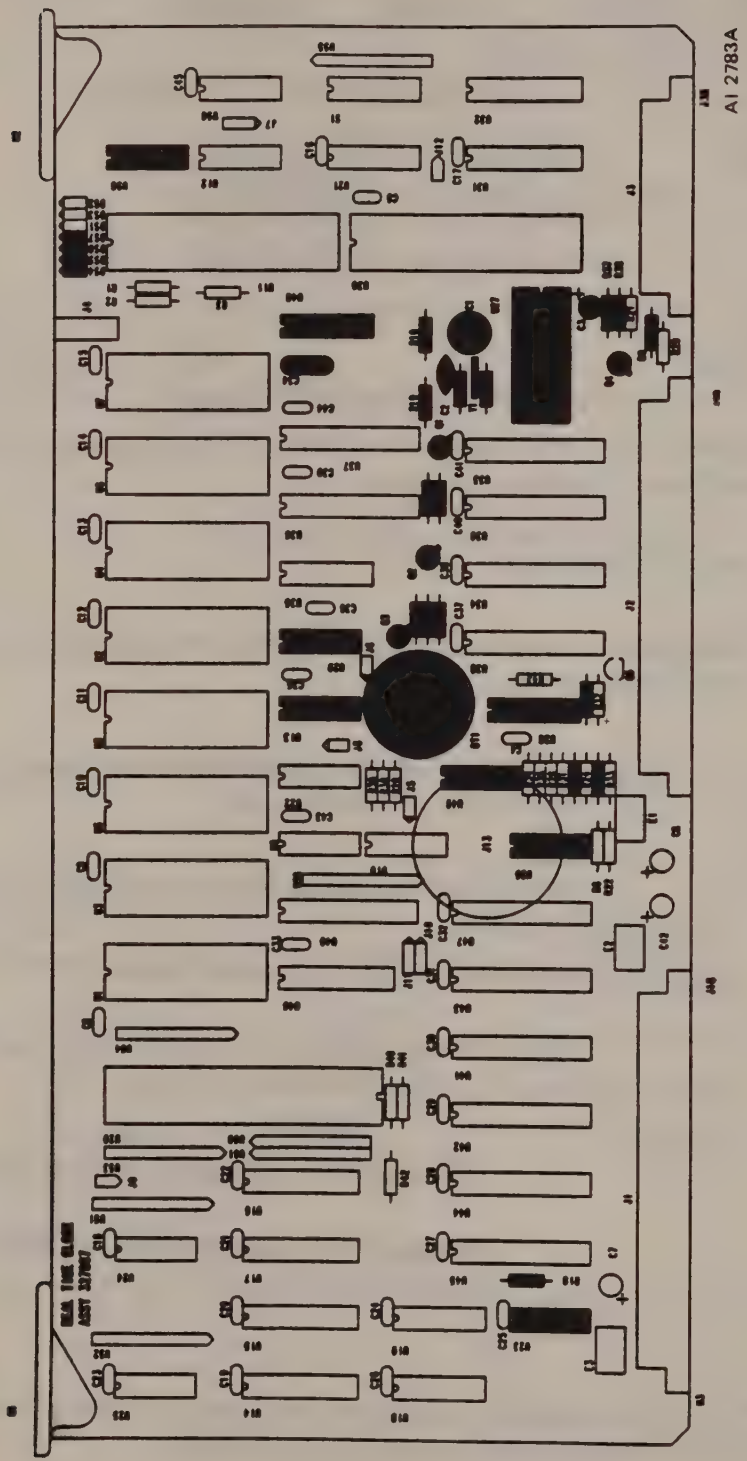


Figure 3.77. Clock/Power Components of RTC Card

Step Two: Preliminary Diagnostic.

NOTE

These diagnostics apply only if your AT 9500 Analyzer is version 3.10 or higher. The version number is given in the lower right-hand corner of the sign-on screen, see Figure 3.74.

Several of the diagnostic tests involve both the CPU card and the real-time clock card. When this happens, take the CPU card off the card extender, plug it into the mothercard, remove the real-time clock card, put it on the card extender, and check it.

Test Sixteen tests the two front-panel cards. They won't fit on the card extender. There will be procedures showing you how to take them out of the analyzer and solve the problems they might be causing.

CAUTION

Always turn the analyzer power off when changing cards. Always.

CAUTION

When the troubleshooting procedure requires you to replace a chip, turn off the analyzer power, replace the chip, turn the power back on. Diagnostic sequence will start over at Test Zero.

1. Put the CPU card on the Scientific-Atlanta card extender.

2. Turn off the analyzer and remove the "dead-man" jumper, J4, on the real-time clock card. This prevents the diagnostic from resetting before you can write down what happened, see Figure 3.70. (Earlier versions of the RTC card have J4 next to the clock BT1, and you take the RTC card out of the analyzer to remove J4.)

3. On the CPU, set the dip switches as shown in Figure 3.78. When you turn the analyzer back on, diagnostic test will start.

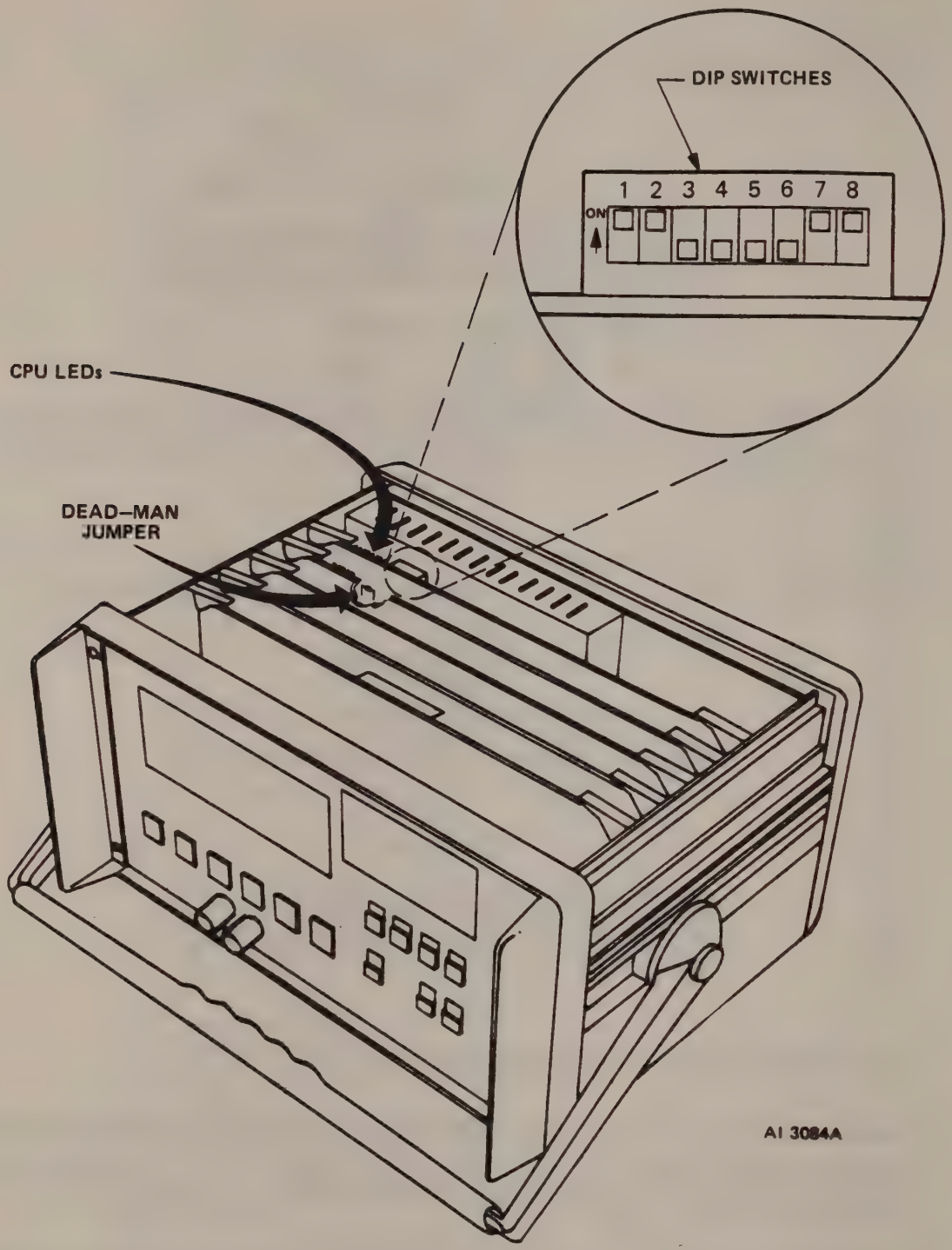


Figure 3.78. CPU Dip Switches and Dead-man Jumper

4. Turn on the analyzer. The sign-on screen appears, followed by a summary screen, and then the eight LEDs on the CPU card.

Sign-on screen does not appear. Connect CRT to serial port to read test results until you can correct problem that is keeping screen from lighting. Continue with diagnostic test.

Sign-on screen appears, summary screen does not appear and LEDs do not light. The front-panel LEDs not lighting means there may be trouble in the demux card, particularly in the bus interface. See Section 3.3.3.

Sign-on screen appears, followed by a summary screen. The eight LEDs on the CPU card should light, go out, then blink in a pattern.

CPU LEDs do not blink in a pattern. First, with analyzer power on, check reset generation. Here's how you do that:

On CPU connector J2 check pin B-23 for logic high (+4.5 to +5.0 volts), see Figure 3.79.

Logic low (zero volts) at pin B-23 of connector J2. Check real-time clock card, **Step One.**

Logic high at pin B-23 of connector J2. Momentarily ground pin B-23 of connector J2.

LEDs light, go blank, then begin to cycle. Check real-time clock card, **Step One.**

Some CPU LEDs are on, but they don't cycle. Ground pin B-23 of connector J2 and hold. Now check pins 45 and 33 of U12 for a logic high (+4.5 volts to +5.0 volts).

Pins 45 and 33 of U12 have a logic high.

Pins 45 and 33 of U12 have a logic low (zero volts). Replace U12 and check pin 6 of U14 for a logic low.

Pin 6 of U14 has a logic low. Check pins 2, 5, 6, 9, 12, 15, 16 and 19 of U21 for a logic low.

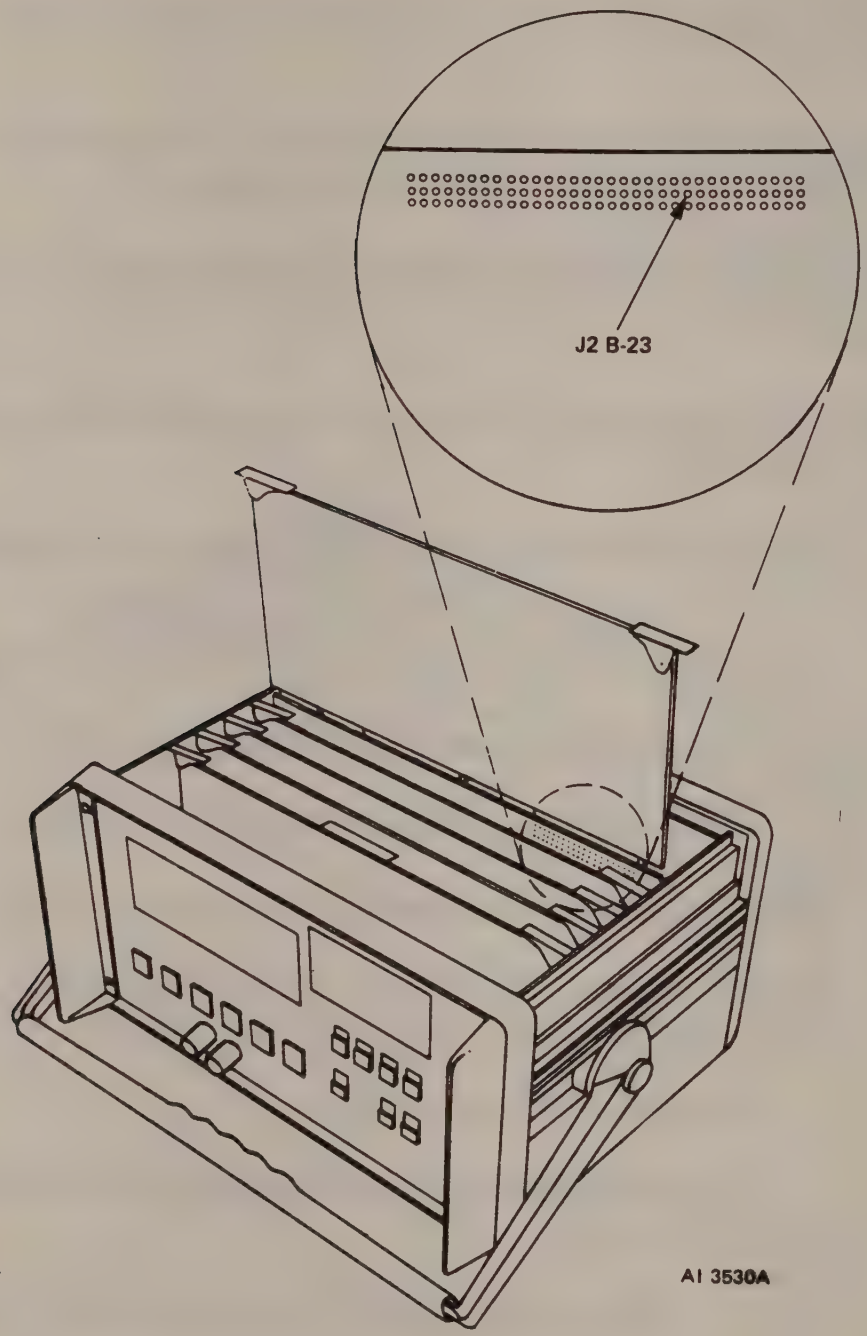


Figure 3.79. CPU Connector Voltage

Pins 2, 5, 6, 9, 12, 15, 16 and 19 on U21 have a logic low. Replace any LEDs that are off.

Any of pins 2, 5, 6, 9, 12, 15, 16 and 19 on U21 have a logic high. Replace U21.

All CPU LEDs are on but they don't cycle. Check pin 45 and 33 of U12 for logic high.

Either pin 45 or 33 of U12 have a logic high. Replace U12.

Neither pin 45 nor 33 of U12 have a logic high. Check pin 84 of U12 for +5.0 volts, 20 MHz sine wave.

No sine wave at pin 84 of U12. Replace crystal Y1 and recheck for sine wave at pin 84 of U12.

Still no sine wave at pin 84 of U12. Replace U12 and check pin 46 of U12 for 20 MHz clock pulse.

No 20 MHz clock pulse at pin 46 of U12. Replace U12 and check pin 47 of U12 for 10 MHz clock pulse.

No 10 MHz clock pulse at pin 47 of U12. Replace U8.

DIAGNOSTIC SEQUENCE STILL DOESNT START. Check DIP switch S1 if your analyzer is Version 3.10 or higher. Check at these pins for each switch position for logic high when the switch is off and a logic low when the switch is on.

Switch No.	Pin No.
1	16
2	15
3	14
4	13
5	12
6	11
7	10
8	9

Any switch position has incorrect voltage. Replace S1.

DIAGNOSTIC SEQUENCE STILL DOESN'T START. Check pin 65 of U12 for a logic high.

Logic high at pin 65 of U12. Check pins 9 and 10 of U17 for logic high.

Both pins 9 and 10 of U17 have logic highs. Replace U17.

Pin 9 of U17 has a logic high, pin 10 of U17 has a logic low. Replace U54.

Pin 9 of U17 has a logic low, pin 10 of U17 has a logic high. Replace U55.

DIAGNOSTIC SEQUENCE STILL DOESN'T START. On the CPU card, replace in this order, and start diagnostic after each replacement, chips U8, U12, U24, U10, U23, U25, and ROMs U2 and U4.

Now if the diagnostic sequence doesn't start, call your Scientific-Atlanta Service Representative. Find the number of the one nearest you in Section 3.4.

Step Three: What the Diagnostic Tests Mean.

Test Zero samples output of refresh counter U24.

Test Zero fails. On the CPU card, check pin 41 of U24 for a 1.19 MHz clock pulse.

There is a 1.19 MHz clock pulse at pin 41 of U24. Replace U24.

Clock pulse not at pin 41 of U24. Replace U12.

Test One checks RAM locations 0 to 0FFFFH.

Test One fails. On the CPU card, check pin 12 of U15 for a low-going pulse every 150 microseconds.

No low-going pulse on pin 12 of U15. Check pins 1, 2, and 13 of U15 for high-going pulses every 150 microseconds.

High-going pulses on pins 1, 2 and 13 of U15. Replace U15.

No high-going pulse on pins 1 or 2 or 13 of U15. Check pin 71 of U12 for low-going pulse.

Low-going pulse on pin 71 of U12. Replace U12.

No pulse on pin 71 of U12. Replace U24 and check pin 13 of U15 for low-going, 150 microsecond pulse.

No pulse on pin 13 of U15. Replace U10 and check pins 7, 2, 3, and 5 of U16 for high-going pulse every 150 microseconds.

No pulses on pins 7, 2, 3 and 5 of U16. Replace U16.

Low-going pulse on pin 12 of U15. Replace in this order, and rerun diagnostic after each replacement, chips U29, U30, U31, U32, U23, and U25.

Test Two checks RAM locations 10000H to 01FFFFH.

Test Two fails. On the CPU card, replace in this order, and rerun diagnostic after each replacement: U29, U30, U31 and U32.

Test Three checks RAM locations 20000H to 02FFFFH.

Test Three fails. On the CPU card, replace in this order, and rerun diagnostic after each replacement: U29, U30, U31 and U32.

Test Four checks RAM locations 30000H to 03FFFFH.

Test Four fails. On the CPU card, replace in this order, and rerun diagnostic after each replacement: U29, U30, U31 and U32.

Test Five checks RAM locations 40000H to 04FFFFH.

Test Five fails. On the CPU card, replace in this order, and rerun diagnostic after each replacement: U29, U30, U31 and U32.

Test Six checks RAM locations 50000H to 05FFFFH.

Test Six fails. On the CPU card, replace in this order, and rerun diagnostic after each replacement: U29, U30, U31 and U32.

Test Seven checks RAM locations 60000H to 06FFFFH.

Test Seven fails. On the CPU card, replace in this order, and rerun diagnostic after each replacement: U29, U30, U31 and U32.

Test Eight checks RAM locations 70000H to 07FFFFH.

Test Eight fails. On the CPU card, replace in this order, and rerun diagnostic after each replacement: U29, U30, U31 and U32.

Test Nine checks the memory-mapped, input-output bus to the CPU card.

Test Nine fails. Check LEDs on edge of CPU card for a reading of 0 0 0 0 1 0 0 1 (off, off, off, off, on, off, off, on) which means test nine has failed, but the fail light (far left) is off, see Figure 3.78.

LED reading is correct. Check pin 2 of U55 for a logic low.

Logic low is at pin 2 of U55. Remove transmitter card while watching voltage level at pin 2 of U55.

Voltage at pin 2 of U55 stays low. Transmitter card is bad. Replace it, and repeat this procedure for all other application cards in analyzer.

Removing any card makes voltage at pin 2 of U55 go high. Check that particular card before going any farther.

Removing and replacing all cards doesn't change voltage at pin 2 of U55. Remove four screws holding front-panel assembly to analyzer, and lay front panel down flat, Figure 3.80, and disconnect two flat-ribbon cables connecting front-panel cards to mothercard. Start diagnostic and watch voltage at pin 2 of U55 on CPU card.

Voltage at pin 2 of U55 goes high. Check results of diagnostic test for front-panel card, see **Test Sixteen.**

Voltage at pin 2 of U55 stays low. Check results of diagnostic test for real-time clock card, see **Test Sixteen.**

Logic high is at pin 2 of U55. Replace U55.

Test fail light (far left) is on and test failure reading is correct. Check pin 18 of U35 for a 10 MHz clock pulse.

No clock signal at pin 18 of U35. Check pin 1 of U35 for a logic low.

Logic low is at pin 18 of U35. Replace U35.

Logic high is at pin 18 of U35. Replace U55.

Test Nine still fails. Replace real-time clock card with one new one, or one you know is good and rerun diagnostic.

You don't have a good real-time clock card. Replace on the real-time clock card in this order, and rerun diagnostic sequence after each replacement: U47, U48, U49, U50, U56, U55, U44 and U53.

Test Ten checks the RS-232 serial port.

Test Ten fails. Check results of **Test Thirteen** and **Test Fourteen.**

Tests Thirteen AND Fourteen fail. Check I/O bus interface on the real-time clock card. Replace, in this order, and rerun diagnostic sequence after each replacement: U33, U34, U38,U36, U37, U39 and U35.

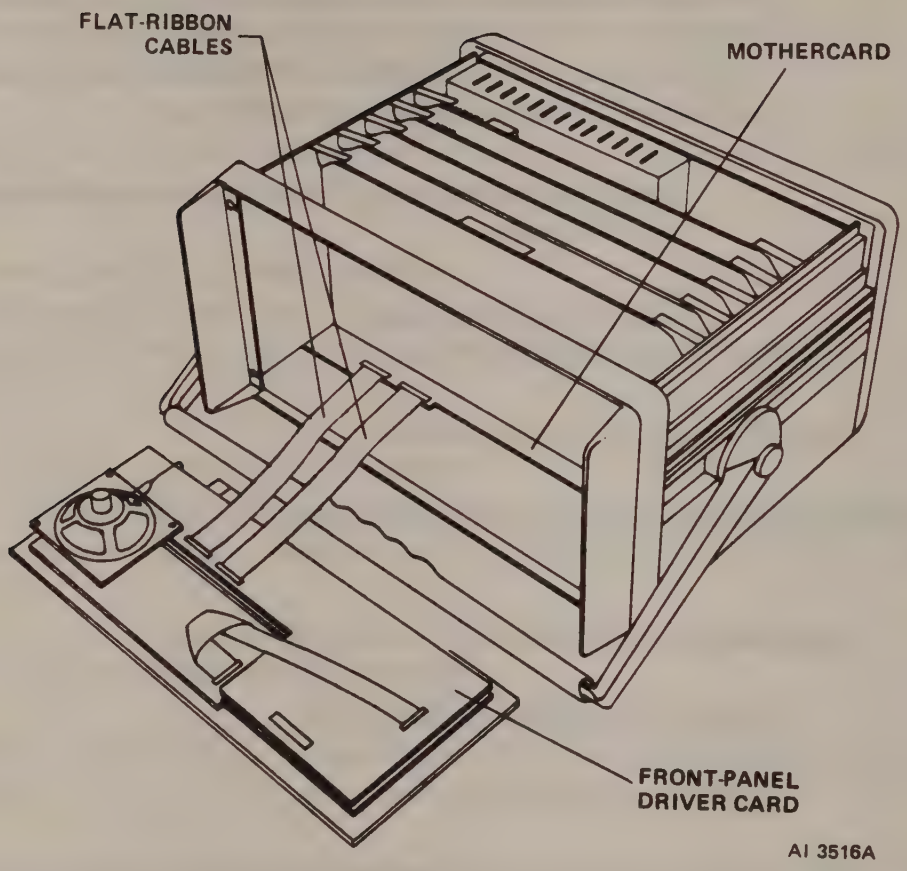


Figure 3.80. Front-panel Flat-ribbon Cables

Test Thirteen OR Test Fourteen fails. Check pin 8 of oscillator U12 for approximately 8 MHz clock pulse.

No clock pulse at pin 8 of oscillator U12. Replace U12.

Clock pulse is at pin 8 of oscillator U12. Replace U11.

Test Ten passes. Check terminal output connected to serial output COM1 (25-pin D connector).

Terminal reads "LOOP." Test Ten is good.

Terminal does not read "LOOP." Check serial drivers U50 and U52 on mothercard, and also check serial terminal for configuration of 9600 baud, 8 data bits, 1 stop bit, no parity and no hardware or software flow-control.

Test Eleven checks the analyzer front panel and front-panel interface.

Test Eleven fails. Check if Test Sixteen passes or fails.

Test Sixteen fails. Remove four screws holding front panel to analyzer and lay front panel down flat, see Figure 3.80. On the front-panel driver card, replace, in this order, and rerun diagnostic after each replacement: U3, U6, U1, U2, U5, U4 and U17.

Test Sixteen passes. After replacing any one of U3, U6, U1, U2, or U4, replace U5 and rerun diagnostic.

Test Eleven and Test Sixteen fail again. Replace LCD card. Here's how you do that:

1. Remove three screws holding speaker mounting board to front panel, see Figure 3.81.
2. Disconnect speaker connection from front-panel LED card.
3. Disconnect ribbon cable that connects the front-panel driver card to the LCD card, at the LCD card connector.
4. Remove four LCD card mounting screws and remove LCD card.
5. Replace with new LCD card, reconnect everything and rerun diagnostic.

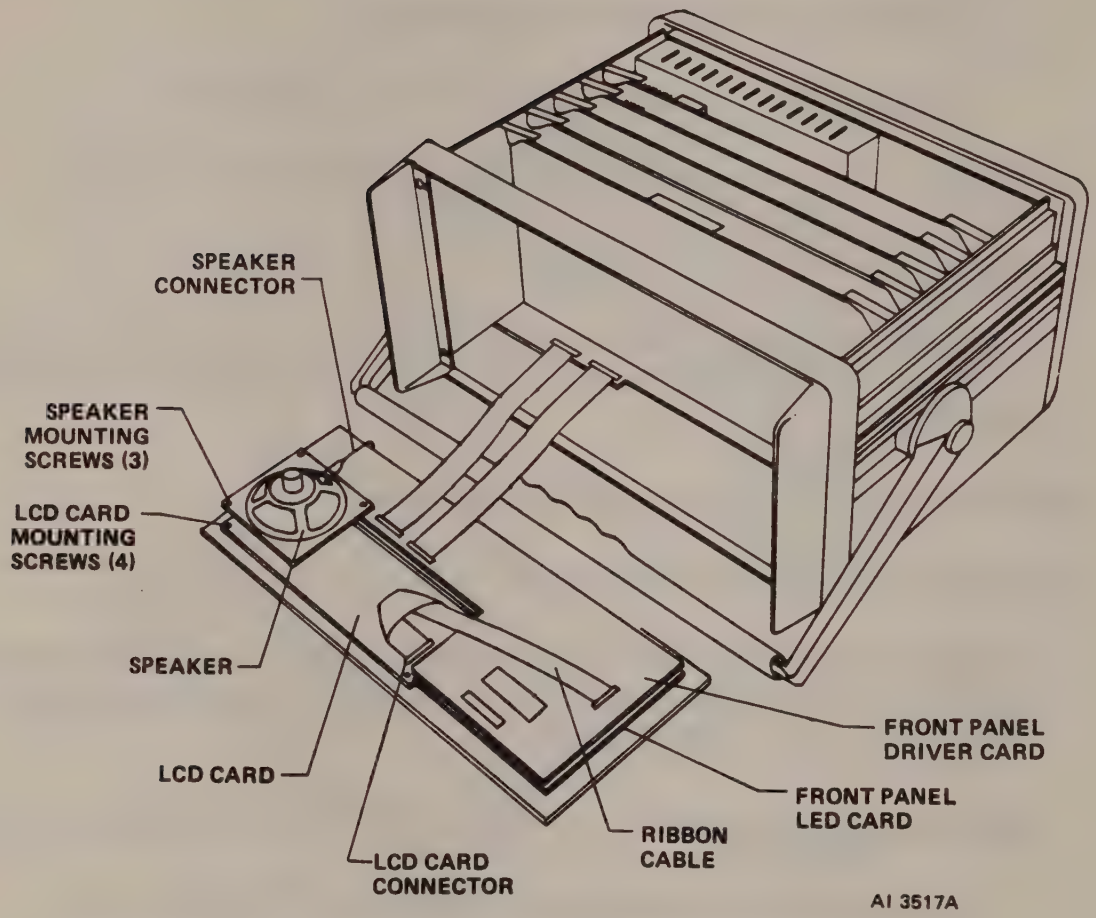


Figure 3.81. Replacing LCD Card

Test Twelve checks the four EPROMs on the CPU card. This test will always "pass" and show ROM checksums on the front-panel screen. The sequence pauses long enough for you to write down the checksums.

Test Twelve shows four checksums. Compare checksums with those on EPROM labels.

Checksums don't match. Replace EPROMS whose checksums don't match.

Test Thirteen checks RTC U27 and crystal Y1.

Test Thirteen fails. On the real-time clock card, check pin 11 of U27 for +4.0 volt sine wave at 32.768 kHz.

Sine wave not at pin 11 of U27. Replace crystal Y1.

Sine wave at pin 11 of U27. Replace U27 and run diagnostic again.

Test Thirteen fails again. Replace crystal Y1.

Test Thirteen passes.

Test Fourteen checks GPIB U30 on the RTC card.

Test Fourteen fails. On the real-time clock card, replace U30.

Test Fifteen checks U24 on the CPU card.

Test Fifteen fails. On the CPU card, replace U24.

Test Sixteen checks the front-panel controller U15 on the front-panel card. Usually, when test sixteen fails, the front-panel lights will be out, or you'll have no sign-on screen nor summary screen.

Test Sixteen fails, front-panel LEDs are out, and you get a screen or terminal error message HIT ANY FRONT-PANEL KEY. Hit any front panel key to keep diagnostic sequence from cycling.

1. Remove four screws and remove front panel of analyzer, see Figure 3.82.
2. Lay front panel down flat as shown in Figure 3.82, and disconnect the ribbon cable from the front-panel driver card to the LCD card.
3. Refer to Figure 3.83 to locate components on the front-panel driver card.
4. Replace U15 and rerun diagnostic.

Test Sixteen fails again and you have no sign-on screen, or you have a sign-on screen and no summary screen. On connector J5 of the front-panel driver, see Figure 3.83, check with oscilloscope, in sequence, pins 9, 10, 11, 12, 13, 14, 15 and 16 for a logic high with occasional low pulses.

Voltage at pins 9 through 16 have a logic high, with occasional low pulses. Check J5, pin 3, for a logic high and check J5, pin 6 for pulses.

J5, pin 3 has a logic high and J5, pin 6 has pulses. Replace LCD card. Here's how you do that.

1. Remove three screws holding speaker mounting board to front panel, see Figure 3.81.
2. Disconnect speaker connection from front-panel LED card.
3. Disconnect ribbon cable from front-panel driver card to LCD card, at the LCD card connector.
4. Remove four LCD screws and remove LCD card.
5. Replace with new LCD card and rerun diagnostic.

J5, pin 3 does not have a logic high. Check U17, pin 9 for a logic low.

Pin 9 of U17 has a logic low. Replace U17.

Pin 9 of U17 has a logic high. Check U17, pin 5 for a logic high.

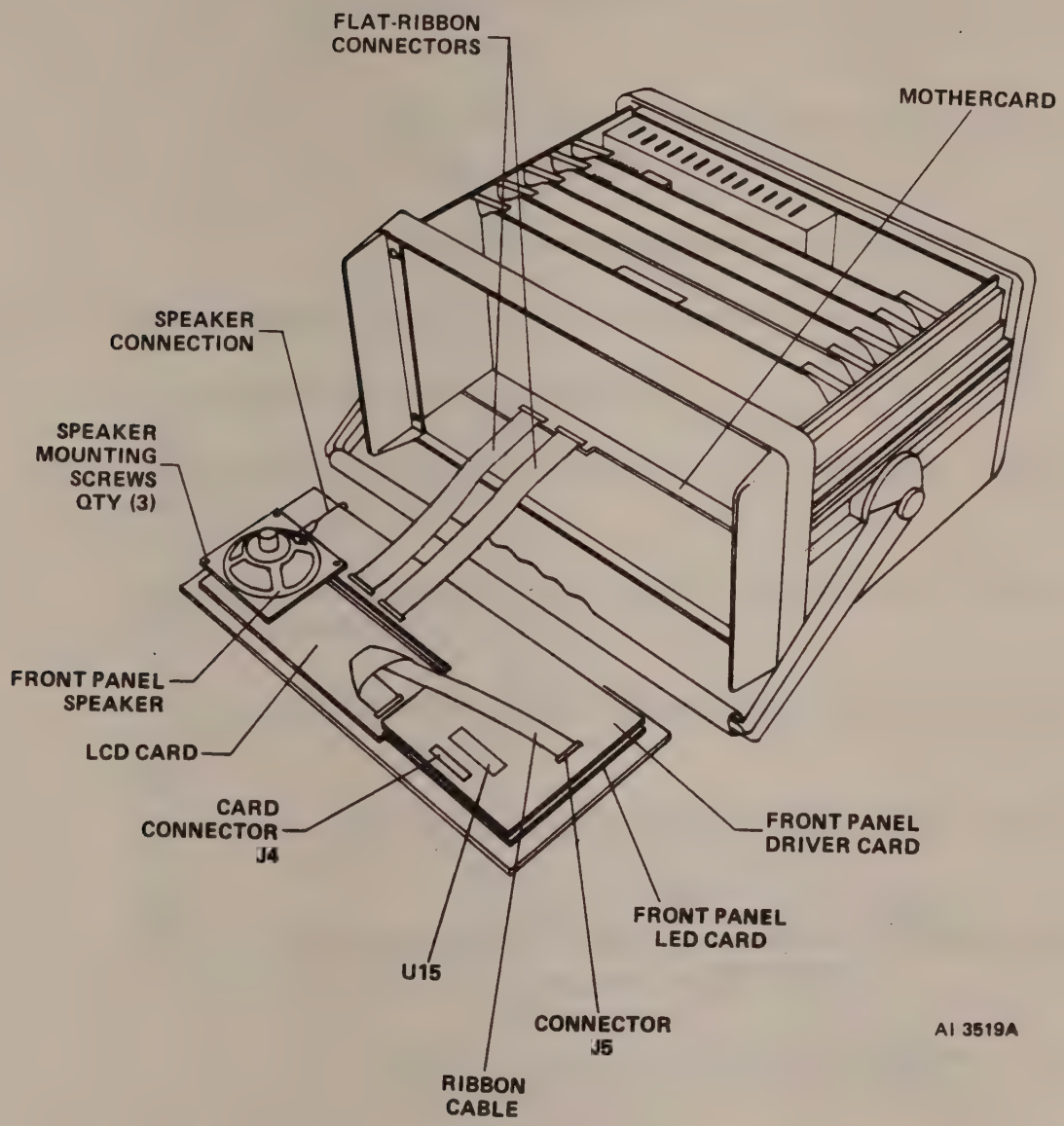


Figure 3.82. Front-panel Components

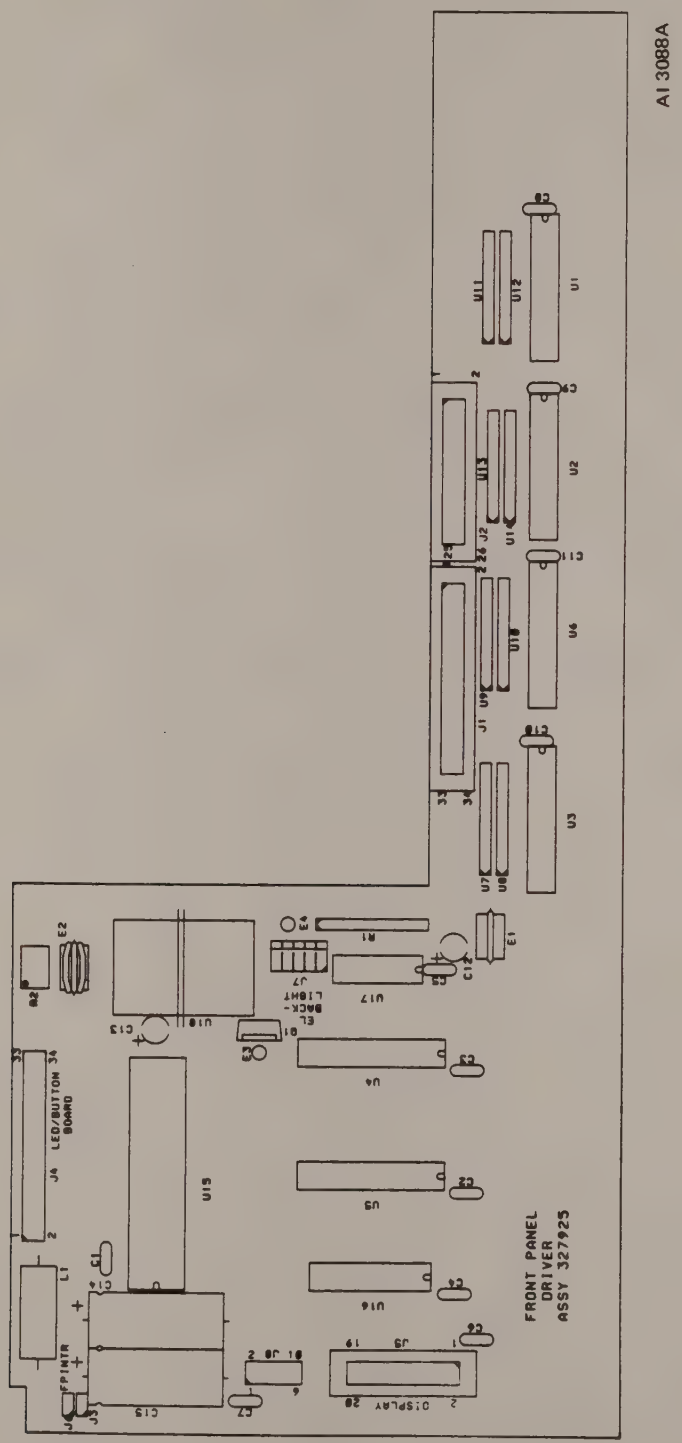


Figure 3.83. Front-panel Driver Components

Pin 5 of U17 is high. Replace U17 and check pin 9 again for a logic low and pin 8 for low-going pulses.

On U17, pin 9 is low and pin 8 has low-going pulses. Replace U5 and check J5 pin 3 for changing logic levels.

No changes in logic levels at J5, pin 3. Replace U1.

J5, pin 6 has no pulses. Replace U5 and check J5, pins 7 and 8 for pulses.

No pulses at pins 7 and 8 of J5. Replace U4

Voltage at pins 9 through 16 is high and does not vary. Check inputs of U3 and U6, pins 2, 3, 4, 5, 6, 7, 8 and 9 for any logic level transitions.

Pins 2 through 9 of U3 and U6 have voltage with variations. Check control inputs of U3 and U6, pins 1 and 13 for high voltage with random low pulses.

Pins 1 and 13 of U3 and U6 have high logic with random low pulses. Replace U3 and/or U6.

Pins 1 and 13 have no transitions. Replace address decoder U4 and recheck pins 1 and 13 of U3 and U6.

Pins 1 and 13 still have no voltage. Replace address buffers U1 and U2. Check J5, pin 3, for a logic high and check J5, pin 6 for pulses.

J5, pin 3 has a logic high and J5, pin 6 has pulses. Replace LCD card. Here's how you do that:

1. Remove three screws holding speaker mounting board to front panel, see Figure 3.81.
2. Disconnect speaker connection from front-panel LED card.
3. Disconnect ribbon cable from front-panel driver card to LCD card, at the LCD card connector.

4. Remove four LCD screws and remove LCD card.
5. Replace with new LCD card, reconnect ribbon cables and rerun diagnostic.

J5, pin 3, does not have a logic high. Check U17, pin 9 for a logic low.

Pin 9 of U17 has a logic low. Replace U17.

Pin 9 of U17 has a logic high. Check U17, pin 5 for a logic high.

Pin 5 of U17 is high. Replace U17 and check pin 9 again for a logic low and pin 8 for low-going pulses.

On U17, pin 9 is low and pin 8 has low-going pulses. Replace U5 and check J5 pin 3 for changing logic levels.

No changes in logic levels at J5, pin 3. Replace U1.

J5, pin 6, has no pulses. Replace U5 and check J5, pins 7 and 8 for pulses.

No pulses at pins 7 and 8 of J5. Replace U4.

Test Sixteen fails and screen shows sign-on screen but the LEDs don't light, or they light but flicker. On front-panel driver card, see Figure 3.82 and Figure 3.83, check inputs to U15. Turn analyzer off, then on, and with oscilloscope, check pin 3 of U15 for 1.25 MHz clock pulse.

Clock pulse is at pin 3 of U15. Turn analyzer off, then check pin 9 of U15 for a logic high.

Pin 9 of U15 is not at a logic high. Replace U17 and go to next step.

Pin 9 of U15 is at a logic high. Turn analyzer on and check pin 9 for a logic low.

Pin 9 doesn't go to a logic low. Replace U17 and go to next step.

Pin 9 goes to a logic low. Replace U15 and check replacement U15, pins 12, 13, 14, 15, 16, 17, 18 and 19 of U15 for data transitions.

Data transitions are at all pins. Go to next step.

Some data transitions are missing. Refer to schematic and check appropriate data base buffers. Replace them as necessary.

Check pins 10 and 11 of U15 for low pulses.

No low pulses at pins 10 and 11 of U15. Replace U4 and go to next step.

Low pulses at pins 10 and 11 of U15. Replace U15.

Check pin 22 of U15 for low pulses.

No low pulses at pin 22 of U15. Replace U5 and go to next step.

Low pulses at pin 22 of U15. Replace U15.

No clock pulse at pin 3 of U15. Check pin 1 of U15 for 10 MHz clock pulse.

Clock pulse at pin 1 of U15. Replace U5.

No clock pulse at pin 1 of U15. Replace U2.

With oscilloscope, check output of U15, pins 32, 33, 34 and 35 for high pulses with occasional low pulses. Pulses should be in sequence, beginning with the pulse at pin 32, see Figure 3.84.

Voltage highs and occasional lows at pins 32, 33, 34 and 35 in proper sequence. Go to next step, check front-panel LED board.

Voltage missing at either pins 32, 33, 34 or 35 of U15. Replace U15.

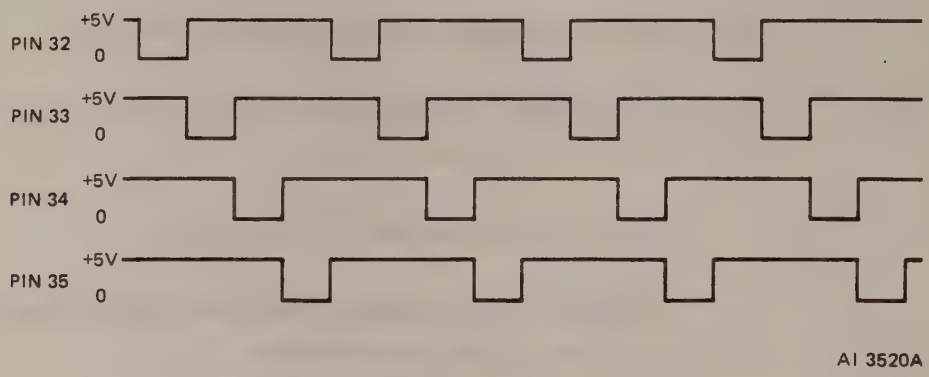


Figure 3.84. Front-panel Driver U15 Output Pulses

Voltage at pin 32, 33, 34, or 35 of replacement U15 , still goes low. Check front-panel LED card, see Figure 3.85.

1. Disconnect ribbon cable from front-panel driver card to LCD card.
2. Disconnect speaker connection from front-panel LED card.
3. Remove three screws holding speaker and speaker mounting board and remove speaker.
4. Before you separate the front-panel driver card from the front-panel LED card, notice which LEDs are out; columns, rows, or individual LEDs.
5. Remove eleven screws and threaded stand-offs. Don't disconnect ribbon cables from front-panel driver card to mothercard.
6. J4 connects the two front-panel cards. Carefully pull the front-panel driver card straight up and disconnect J4, being careful not to bend any pins.
7. Look at a schematic of the front-panel LED card. The LEDs light when transistors U8 or U9 switch +5 volts to the LED's anode, through the dropping resistor, at the same time U1 grounds the LED's cathode.

    - Therefore, if a column of LEDs are out, check U1 or the connection between U1 on the front-panel LED card and U15 on the front-panel driver card. (Connector J1 on the LED card and connector J4 on the driver card.)
    - If a row of LEDs is out, check transistors U8 or U9, U6 or U7, or the connection between U8 and U9 on the front-panel LED card and U15 on the front-panel driver card.
    - If a single LED is out, the problem is either the LED itself or its dropping resistor.

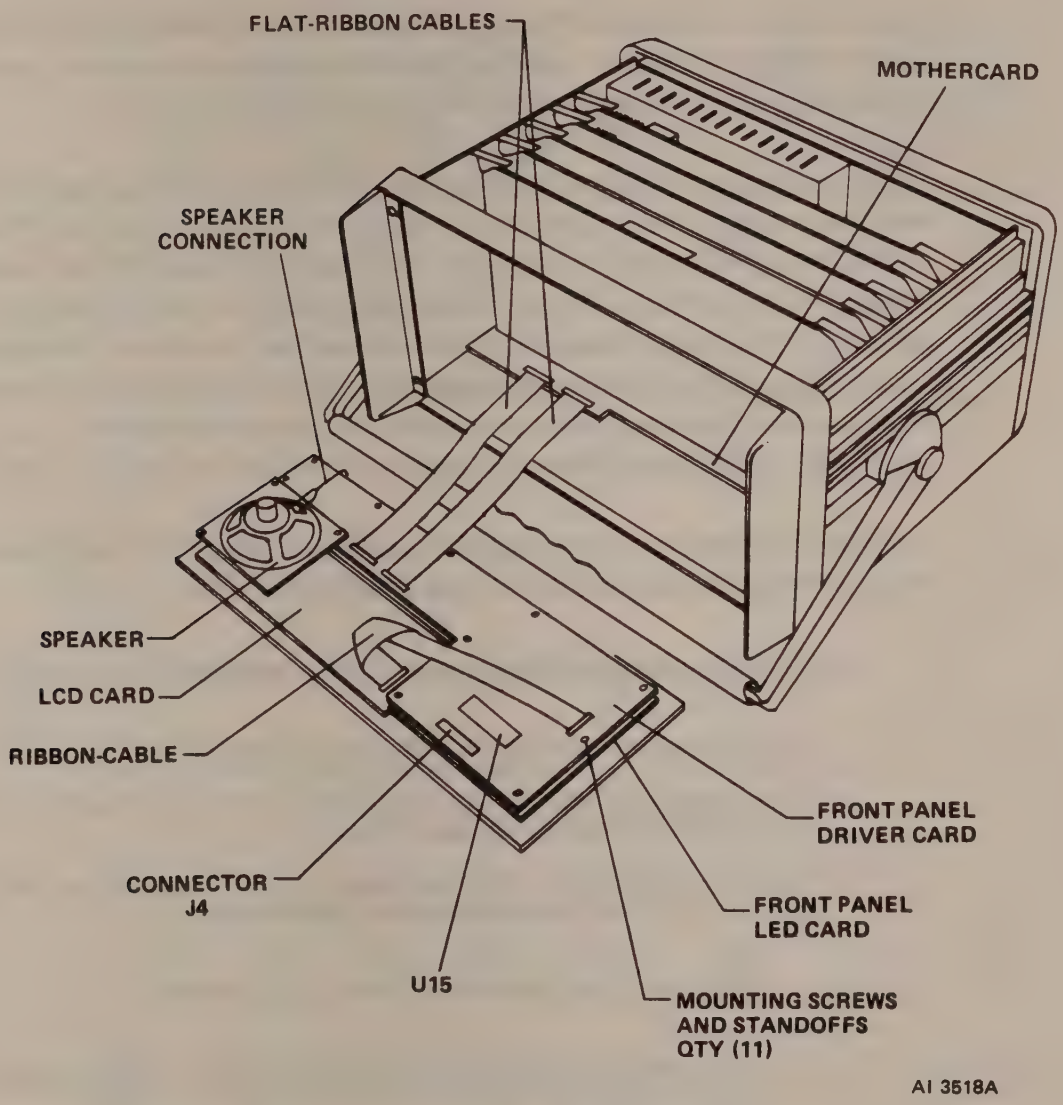


Figure 3.85. Front-panel Disassembly

On the front-panel driver card, on U15, pins 24 through 31 correspond directly to LEDs on the front panel. If the LEDs are blinking in a pattern, there will be corresponding changes in voltage levels measured in the circuit between the LEDs and pins 24 through 31 on U15.

Refer to the schematics for the front-panel driver and the front-panel LED cards and to Table 5.1 which lists the components in the circuit from LEDs to U15. For example, the DS3 PATT LOSS, DS1 PATT LOSS lights, and the LEDs in the RUN and MEASUREMENT AUX switch are blinking. Table 5.1 tells you, we hope, to check signal LEDATA2 , through pins 14 and 3 of resistor U6, where the signal changes to LR2, through pins 7 and 6 of transistor U8, through pins 14 and 3 of resistor U7, where the signal changes to LROW2, to pin 3 of connector J1 and then on to the front-panel driver card. There, the signal can be found on pin 3 of connector J4, and is now called LWROW2 again, but immediately changing to CT2 and finally shows up on pin 25 of U15.

This procedure indicates that when this particular set of front-panel LEDs blink, the voltage should drop at all these points along the way, and finally drop at pin 25 of U15.

LEDs blink in patterns, but voltage doesn't drop on corresponding pins of U15.

1. Check components in that particular circuit, see schematics and Table 5.1.
2. Check, in sequence, outputs of U15, pins 24, 25, 26, 27, 28, 29, 30 and 31 for voltages that vary with the blinking front-panel LEDs.
3. Check front-panel switches. With oscilloscope, on U3, U4 and U5, check that pins 3, 5, 7, 9, 12, 14, 16 and 18 go low when pins 1 and 19 go low.

Pins do not go low. Replace U3, U4 or U5 as necessary.

Check that when outputs of U3 (SL0-1...SL0-8), U4 (SL1-1...SL1-8) and U5 (SL21...SL2-8), and the corresponding scan line switch (SL) is pressed, the corresponding return line (RL0-RL7) goes low.

Corresponding scan lines do not go low. Replace scan line switch.

Table 3.1

U15		J4		J1		U7		TRANSISTOR U8			TRANSISTOR U9			U6			FRONT PANEL LIGHTS
Pin	Label	Label	Pin	Pin	Label	In	Out	In	Out	Label	In	Out	Label	In	Out	Label	
24	CT3	LWROW3	4	4	LROW3	4	13	2	1	LR3				4	13	LEDDATA3	DS3 BLUE DS1 BLUE STOP DS3 STATUS Switch
25	CT2	LWROW2	3	3	LORW2	3	14	6	7	LR2				3	14	LEDDATA2	DS3 PATT LOSS DS1 PATT LOSS RUN Switch MEASUREMENTS AUX Switch
26	CT1	LWROW1	2	2	LROW1	2	15	9	8	LR1				2	15	LEDDATA1	DS3 LOF DS1 LOF REMOTE Switch XMTR Switch
27	CTO	LWROW1	1	1	LROW0	1	16	13	14	LRO				1	16	LEDDATA0	DS3 LOS HISTORY DS1 LOS Present PWR LOSS RCVR/THRE Switch
28	CT7	LWROW7	8	8	LROW7	8	9				2	2	LR7	8	9	LEDDATA7	DS3 BLUE/AIS DS1 BLUE/AIS DEMUX Switch MEASUREMENTS DS1 Switch
29	CT6	LWROW6	7	7	LROW6	7	10				6	6	LR6	7	10	LEDDATA6	DS3 PATT LOSS DS1 PATT LOSS SYSTEM Switch MEASUREMENTS DS3 Switch
30	CT5	LWROW5	6	6	LROW5	6	11				9	13	LR5	6	11	LEDDATA5	DS3LOF DS1 LOF TIME Switch MEASUREMENTS SUMMARY Switch
31	CT4	LWROW4	5	5	LROW4	5	12				13	14	LR4	5	12	LEDDATA4	DS3 LOS Present DS1 LOS HISTORY SHIFT Switch DTATUS DS1 Switch

Test Seventeen checks the interrupt buffers (U24) on the CPU card and on the front-panel card.

Test Seventeen will fail if Test Sixteen fails. Correct problem Test Sixteen caught.

Test Seventeen fails and Test Sixteen passes. Remove front panel, see Figure 3.85. On front-panel driver card, check pin 4 of U15 for logic low.

Pin 4 of U15 has logic low. Replace U15.

Pin 4 of U15 has logic high. Check pin 2 of U17 for logic high.

Pin 2 of U17 has a logic high. Replace U17.

Pin 2 of U17 has a logic low. Make sure jumper is on J6 and on the CPU card, check pin 5 of U46 for a logic high.

Pin 5 of U46 on the CPU card has a logic high. Check mothercard, Section 3.3.6.

Pin 5 of U46 on the CPU card has a logic low. Check pin 20 of U46 for a logic low.

Pin 20 of U46 has a logic low. Replace U24.

Pin 20 of U46 has logic high. Replace U46.

Test Eighteen checks the serial interrupt from the real-time clock card.

Test Eighteen fails. On the real-time clock card, check pin 5 on U11 for a low with random positive pulses.

Pin 5 on U11 has a logic high. Replace U11.

Pin 5 on U11 has a logic low. On the CPU card, check pin 3 of U46 for a logic high.

Pin 3 of U46 has a logic high. Check mothercard, Section 3.3.6.

Pin 3 of U46 has a logic low or has a logic low with random positive pulses. Check pin 22 of U46 for a logic high.

Pin 22 of U46 has a logic high. Replace U46.

Pin 22 of U46 has a logic low or low with a random positive pulse. Replace U24.

Test Nineteen checks the 10-millisecond interrupt. The interrupt is produced by the real-time clock (U27) on the RTC card and is buffered by U26B. The interrupt then goes to U37 on the CPU card and to U24.

Test Nineteen fails. Check output of buffer U26, pin 4 with, oscilloscope for a low-going pulse with a 10-millisecond period, see Figure 3.86.

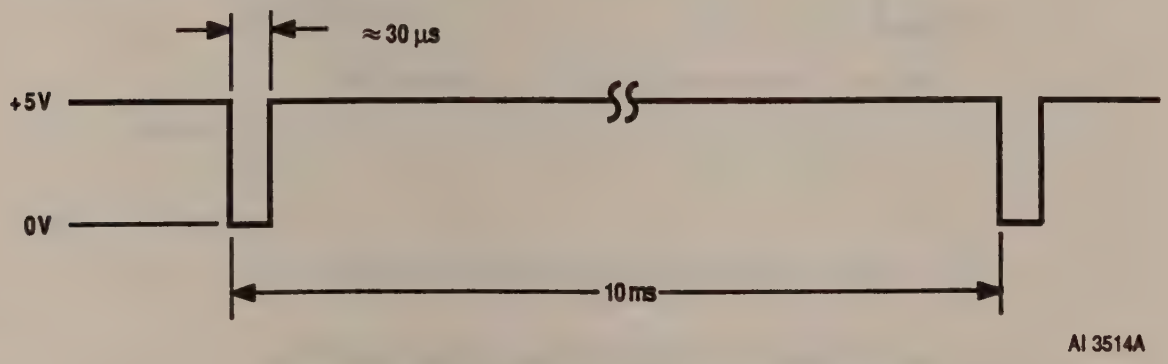


Figure 3.86. 10-Millisecond Interrupt Pulse

No 10-millisecond interrupt pulse at pin 4 of U26. On RTC card, check U27, pin 13 for high-going, 10-millisecond, interrupt pulse.

Interrupt pulse at pin 13 of U27. Replace U26.

No interrupt pulse at pin 13 of U27. Check pin 11 for an approximately 2-volt, 32 kHz sine wave.

Sine wave not at pin 11. Replace crystal Y1.

Sine wave at pin 11. Replace U27.

Test Twenty checks the 50-millisecond latch pulse. If **Test Nineteen** failed because of U27 on the real-time clock card, **Test Twenty** will also fail.

Test Twenty fails. On the real-time clock card, check pin 6 of buffer U26 for a 50-millisecond latch pulse, see Figure 3.87.

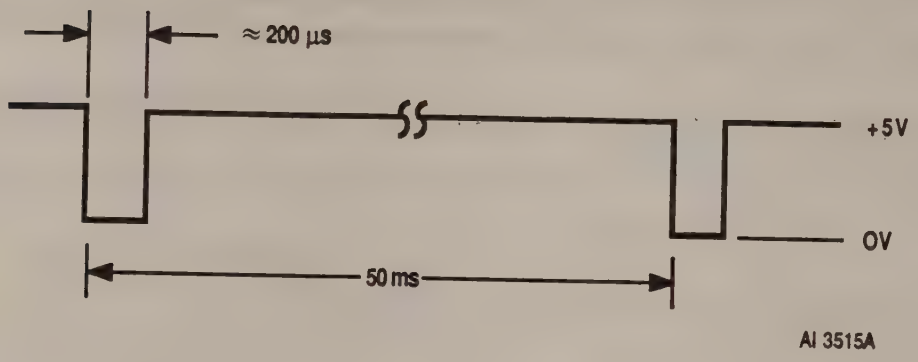


Figure 3.87. Typical 50 ms/200 µs Latch Pulse

50-millisecond latch pulse not at pin 6 of U26. Check output of U58, pin 5 for 50-millisecond clock pulse, inverted from the pulse shown in Figure 3.87.

50-millisecond latch pulse at pin 5 of U58. Replace U26.

No 50-millisecond latch pulse at pin 5 of U58. Check pin 12 of signal divider U29 for a high-going latch pulse, 10 milliseconds wide, and 50 milliseconds apart, see Figure 3.88.

50-millisecond pulse is at pin 12 of U29. Replace U58.

No 50-millisecond pulse at pin 12 of U29. Check input pin 1 and pin 13 of U29 for a logic one.

No logic one at pin 13 or at pin 1 of U29. Check for logic one at input of U28, pin 9.

No logic one at pin 9 of U28. Check mothercard, Section 3.3.6.

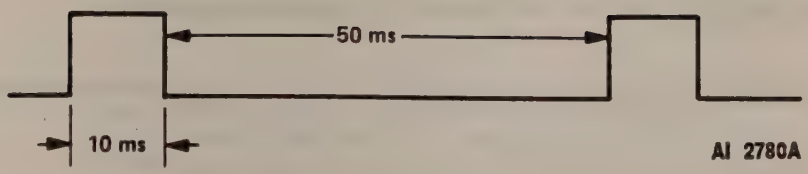


Figure 3.88. Typical 50 ms/10 ms Latch Pulse

Logic one at pin 9 of U28. Check pin 1 of U49 for logic zero.

Logic zero at pin 1 of U49. Replace U28.

Logic one at pin 1 of U49. Check pin 5 of U13 for logic one.

Logic zero at pin 5 of U13. Replace U49.

Logic one at pin 5 of U13. Check pin 13 of U13 for logic zero.

Logic one at pin 13 of U13. Replace U13.

Test Twenty-One checks U24 on the CPU card.

Test Twenty-One fails. On CPU card, replace U24.

Test Twenty-Two checks U24 on the CPU card and U11 on the RTC card.

Test Twenty-Two fails. On CPU card, replace U24 and rerun diagnostic.

Test Twenty-Two fails again. On the RTC card, replace U11.

Test Twenty-Three is the 'beeper' test.

Test Twenty-Three fails. On CPU card, replace U24 and rerun diagnostic.

Test Twenty-Three passes but beeper doesn't beep. On the CPU card, check that jumper on J9 is installed.

Jumper J9 is on. On the real-time clock card, replace beeper speaker SP1.

Test Twenty-Four checks positions 0A0000H to 0AFFFFH of the non-volatile RAM, memory-bus interface and ready generation on the RTC card and memory bus drivers, memory address drivers, bus arbiter and the bus ready generation on the CPU card.

Test Twenty-Four fails. Replace real-time clock card with a new card, or a card you know is good, and rerun diagnostic.

You don't have replacement card, or test fails again. On real-time clock card, check for 10 MHz clock pulse at pin 1 of U47.

10 MHz clock pulse at pin 1 of U47. On CPU card, check U35 pin 9 for a 10 MHz clock pulse.

No 10 MHz clock pulse at pin 9 of U35. Check pin 19 of U35 for logic low.

Logic low at pin 19 of U35. Replace U35.

Logic high at pin 19 of U35. Replace U54.

10 MHz clock pulse at pin 9 of U35. Replace in this order, and rerun diagnostic after each replacement, U39, U38, U40, U41, U54 and U44.

10 MHz clock pulse at pin 1 of U47. Replace U47.

Test Twenty-Five checks positions 0B0000H to 0BFFFFH for bank 0 of the non-volatile RAM, bus interface, ready generation and bank bit register of the RTC card, and the bus data drivers, bus address drivers, bus arbiters and bus ready generation on the CPU card.

If **Test Twenty-Four** failed, **Test Twenty-Five** will probably fail too.

NOTE

Some AT 9500 Analyzers do not have U3 and U4 installed on the real-time clock card. This omission will cause Test Twenty-Five to fail.

Test Twenty-Six checks positions 0B0000H to 0BFFFFH for bank 1 of the non-volatile RAM, memory bus interface, ready generation and bank bit register for the RTC card, and the memory bus drivers, bus address drivers, bus arbiter and bus ready generation on the CPU card.

NOTE

Some AT 9500 Analyzers will not have U5 and U6 installed on the real-time clock card. This omission will cause Test Twenty-Six to fail.

Test Twenty-Seven checks positions 0B0000H to 0BFFFFH for bank 2 of the non-volatile RAM, memory bus interface, ready generation and bank bit register for the RTC card, and the bus data drivers, bus address drivers, bus arbiter and bus ready generation for the CPU card.

NOTE

Some AT 9500 Analyzers will not have DRAMS on the real-time clock card. This omission may cause Test Twenty-Nine to fail, and the diagnostic sequence may hang right here. Turn off the analyzer, disable the diagnostic and go on.

Test Twenty-Eight checks any application cards you are using. You can read the checksums of each ROM on the front panel (or remote terminal) and compare them with the checksums marked on the ROM chips.

After the diagnostic shows you the checksums, it will run a special diagnostics program for each card, if there is one, and you'll see the result of that on the screen also.

Depending on which version of the diagnostic software you have, here's what you'll see on the screen:

NO CARD - does not recognize card.
NO TEST - recognized card, but doesn't have a test for it.
FAIL-XX card failed diagnostic test with code XX.

Any failure might be caused by input-output interface problems on the CPU, the mothercard, or the application card itself.

Test Twenty-Nine checks positions 090000H to 09FFFFH for bank 2 of dynamic RAM, dynamic RAM controller, memory bus interface, and ready generation on the RTC card, memory bus drivers, memory address drivers, bus arbiters and bus ready generation on the CPU card.

3.3.6 Mothercard

With only one exception, checking the mothercard is the last chance for troubleshooting the AT 9500 Analyzer. When you can find nothing else wrong, or when finding and correcting problems doesn't alleviate the symptom, check the mothercard.

The exception: When using the optional printer, and it prints nothing, or it prints gibberish, check the mothercard before anything else. Other than that exception, check everything else first.

When you find no problem with the individual cards, or you find the problem and fix it, and still have malfunctions, carefully check all connectors that plug into the mothercard.

Other than that, return the analyzer to Scientific-Atlanta.

3.4 REGIONAL SERVICE CENTERS

Regional Service Centers capable of performing periodic maintenance and providing assistance associated with the AT 9500 Analyzer and other Scientific-Atlanta equipment are listed on the following pages. Service assistance for areas not listed can be provided through the Scientific-Atlanta Field Service Center, 4388 Shackleford Road, Norcross, Gerogia 30093; TEL: 404-925-5380; TWX: 810-766-4912; TELEX: 0542898.

SCIENTIFIC-ATLANTA REGIONAL SERVICE CENTERS
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Suite 100
Englewood, CO 80112
Tel: 303-790-0585

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Suite D-43
Kissimmee, FL 34741
Tel: 407-846-0055
Fax: 407-846-7937

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5000-F Philadelphia Way
Lanham, MD 20706
Tel: 301-577-4830

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220 Ballardville Street
Wilmington, MA 01887
Tel: 508-658-4310

New Jersey:
River Drive Center Two
Elmwood Park, NJ 07407
Tel: 201-794-3100

Texas:
850 East Arapaho Road
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Tel: 214-238-1116

Washington:
6632 S. 191st Place
Suite E-105
Kent, WA 98032
Tel: 206-251-9114

08/90

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00142 Rome, Italy
Tel: 011-39-6-542-0244
Telex: 621441

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CHAPTER 4
PARTS LIST

4.1 GENERAL

This chapter is the parts list for the AT 9500 Digital Transmission Analyzer.

4.2 EXPLANATION OF PARTS LIST COLUMN HEADINGS

REF. DESIG. The assigned reference designation of a component part or assembly.

PART NUMBER Assigned by Scientific-Atlanta.

DESCRIPTION An electrical/mechanical description of the component or assembly.

VENDOR PART NO. Assigned by manufacturer other than Scientific-Atlanta. If this column is blank, the vendor is Scientific-Atlanta.

CAGE CODE From the Commercial and Government Entity (CAGE) from the Defense Logistics Agency Name-to-Code and Code-to-Name-handbooks. A blank column means Scientific-Atlanta is the vendor or the vendor has not been assigned a CAGE code.

4.3 ORDERING PARTS

Always include the name, the serial number, the part number, the description, the vendor part number, and CAGE code.

CAUTION

Substituting parts may lower performance.

4.4 DIRECTORY

Reference Designator	Part Number	Description	Page
A1	309110	Model AT 9500 Port DTA Assembly	4-3
A1	309100	Model AT 9500 Port DTA AC/DC Assembly	4-4
A1/W4	327959	Fan Assembly	4-5
A1/A1	327970	DS3-DS1/DS0 Demux DTA Assembly	4-6
A1/A1/A1	307223	DS3-DS1/DS0 Demux Subassembly	4-6
A1/A2	327996	Analog DTA Assembly	4-17
A1/A2/A1	327989	Analog Subassembly	4-17
A1/A3	327969	DS1/DS3 Transmitter Assembly	4-32
A1/A3/A1	327890	DS1/DS3 Transmitter Subassembly	4-32
A1/A3	309123	Transmitter Card Assembly	4-41
A1/A3/A1	309237	Transmitter Subassembly	4-41
A1/A4	327968	RTC Assembly	4-48
A1/A4/A1	458359	RTC Subassembly	4-48
A1/A5	307219	CPU Assembly	4-56
A1/A5/A1	307218	CPU Subassembly	4-56
A1/A6	327922	Mothercard Assembly	4-62
A1/A7	309103	Front-panel Assembly	4-69
A1/A7/A1	309256	Front-panel LED Assembly	4-70
A1/A7/A2	306244	Front-panel Bus Assembly	4-73
A1/A7/A2/A1	309259	Front-panel Bus Subassembly	4-73
A1/A7/A3	309141	Speaker Assembly	4-75
A1/A8	327935	AC Power Supply Assembly	4-76
A1/A8	327911	AC/DC Power Supply Assembly	4-79

MODEL AT 9500 PORT DTA ASSEMBLY (A1) - 309110

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
	0306248HDL	HANDLE ASSY DTA PORT		
	0306248TC	COVER TOP DTA PORT		
	0307224	ACCESSORY KIT AC/DC MDL AT 9500		
	0327954	ACCESSORY KIT MDL AT 9500		
1	0306248	ENCLOSURE OPTIONAL DTA AT 9500		
2	0306227	CHASSIS PORTABLE ENCL DTA		
3	0306242	RETAINER PWB DTA		
4	0306226	BRACKET CARD GUIDE DTA		
5	0307248	DECAL SERIAL NO MDL 9500 AC/DC		
6	0309105	PANEL CONNECTOR DTA		
7	0327903	COVER POWER SUPPLY DTA	PER SA DWG 327903	
10	0175522	FAN FGR GUARD 3 1/8 BOXR WIRE	01832	
12	0456951	REAR PANEL DTA PORTABLE		
13	0309649	ASSY POWER CORD AT 9500		
14	0158002	FILTER FAN	PER S A DWG	
16	0306241	FOOT EXTENDER HEIGHT 7"		
22	0306234	SEPARATOR PLASTIC CBL PWB DTA		
44	0309671	LABEL SET EXTERNAL CLOCK CABLE		
45	0457027	SEPARATOR COPPER SHIELD AT 9500		
63	0457031	ASSY GND'D COPPER SHLD AT 9500		
A1	0327970	ASSY PWB DS3-DS1/DS0 DEMUX DTA		
A2	0327996	ASSY PWB ANALOG DTA		
A3	0309123	ASSY PWB XMTR DTA		
A4	0327968	ASSY PWB RTC DTA		
A5	0307219	ASSY PWB CPU DTA		
A6	0327922	ASSY PWB MOTHERBOARD DTA		
A7	0309103	ASSY FRONT PANEL DTA PORT		
A8	0327935	ASSY PWB POWER SPLY AC DTA		
F1	0071229	FUSE 4 AMP	3AG 312004.	75915
F2	0071229	FUSE 4 AMP	3AG 312004.	75915
W1	0327947	HARNESS WIRING AC INPUT DTA	PER SA DWG 327946	
W2	0078600	NOT ASSIGNED	FOR ENG ONLY	
W3	0327953	ASSY POWER CABLE DTA		
W4	0327959	ASSY FAN DTA		
W5	0309137	ASSY CABLE OUTPUT		
W6	0309137	ASSY CABLE OUTPUT	1.00	

MODEL AT 9500 PORT DTA AC/DC ASSEMBLY (A1) - 309100

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
	0306248HDL	HANDLE ASSY DTA PORT		
	0306248TC	COVER TOP DTA PORT		
	0307224	ACCESSORY KIT AC/DC MDL AT 9500		
	0327954	ACCESSORY KIT MDL AT 9500		
1	0306248	ENCLOSURE OPTIONAL DTA AT 9500		
2	0306227	CHASSIS PORTABLE ENCL DTA		
3	0306242	RETAINER PWB DTA		
4	0306226	BRACKET CARD GUIDE DTA		
5	0307248	DECAL SERIAL NO MDL 9500 AC/DC		
6	0309105	PANEL CONNECTOR DTA		
7	0327903	COVER POWER SUPPLY DTA	PER SA DWG 327903	
10	0175522	FAN FGR GUARD 3 1/8 BOXR WIRE	01832	
12	0456951	REAR PANEL DTA PORTABLE		
13	0309649	ASSY POWER CORD AT 9500		
14	0158002	FILTER FAN	PER S A DWG	
16	0306241	FOOT EXTENDER HEIGHT 7"		
22	0306234	SEPARATOR PLASTIC CBL PWB DTA		
44	0309671	LABEL SET EXTERNAL CLOCK CABLE		
45	0457027	SEPARATOR COPPER SHIELD AT 9500		
63	0457031	ASSY GND'D COPPER SHLD AT 9500		
A1	0327970	ASSY PWB DS3-DS1/DS0 DEMUX DTA		
A2	0327996	ASSY PWB ANALOG DTA		
A3	0309123	ASSY PWB XMTR DTA		
A4	0327968	ASSY PWB RTC DTA		
A5	0307219	ASSY PWB CPU DTA		
A6	0327922	ASSY PWB MOTHERBOARD DTA		
A7	0309103	ASSY FRONT PANEL DTA PORT		
A8	0327911	ASSY PWB POWER SPLY AC/DC DTA		
F1	0071229	FUSE 4 AMP	3AG 312004.	75915
F2	0071229	FUSE 4 AMP	3AG 312004.	75915
F3	0084588	FUSE 6 AMP	3AG 312006.	75915
F4	0084588	FUSE 6 AMP	3AG 312006.	75915
W1	0327946	HARNESS WIRING AC/DC INPUT DTA	PER SA DWG 327946	
W2	0078600	NOT ASSIGNED	FOR ENG ONLY	
W3	0327953	ASSY POWER CABLE DTA		
W4	0327959	ASSY FAN DTA		
W5	0309137	ASSY CABLE OUTPUT		
W6	0309137	ASSY CABLE OUTPUT	1.00	

FAN ASSEMBLY (A1/W4) - 327959

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
B1	0177178	FAN 3.15 SQ 5VDC.44A 26 CMF	FSC80-05M	
P1	0176026	CONN RECT MASS TERM 3 POS	CE100F24-3	

DS3-DS1/DS0 DEMUX DTA ASSEMBLY (A1/A1) - 327970

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
1	0307223	SUB-ASSY PWB DS3-DS1/DSO DEMUX		
2	0082463	EXTRACTOR PC BOARD	5005-08N	13103
3	0457044	EPROM & LABEL SET DEMUX		
J5	0084940	CONN COAX SMB MALE PC MT 75 OHM	51-151-0000	98291
J7	0174930	CONN HEADER SGL ROW STRAIGHT 3-PIN LK	MLSS100-3	
J8	0084940	CONN COAX SMB MALE PC MT 75 OHM	51-151-0000	98291
J10	0174930	CONN HEADER SGL ROW STRAIGHT 3-PIN LK	MLSS100-3	
J13	0174930	CONN HEADER SGL ROW STRAIGHT 3-PIN LK	MLSS100-3	
J15	0085126	CONN HEADER DBL ROW STRAIGHT 10-PIN PC	87227-5	00779
U1	0307959	ASSY PAL PROGRAM U1 DEMUX		
U10	0457000	ASSY PAL PROGRAM U10 DEMUX		
U28	0307951	ASSY PAL PROGRAM U28 DEMUX		
U29	0306224	ASSY PAL PROGRAM U29 DEMUX		
U36	0457001	ASSY PAL PROGRAM U36 DEMUX		
U38	0307957	ASSY PAL PROGRAM U38 DEMUX		
U40	0307963	ASSY PAL PROGRAM U40 DEMUX		

DS3-DS1/DS0 DEMUX SUBASSEMBLY (A1/A1/A1) - 307223

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
BB1	0177102	BUS DSTRBTN 2-LYR VERT MT DIP	QV-2 17.6.3 (.1)	
BB2	0177102	BUS DSTRBTN 2-LYR VERT MT DIP	QV-2 17.6.3 (.1)	
C1	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C2	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C3	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C4	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C5	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C6	0081210	CAPACITR .01 MF 50V CER MONO X7R 10%	RPE121X7R103K50V	72982
C7	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C8	0070470	CAPACITR 10 PF 500V SILVER MICA 5%	CD15CD100J03	14655
C9	0174000	NOT USED ON THIS ASSEMBLY		
C10	0035656	CAPACITR 100 MF 20V SOLID TANT POL 10%	T362D107K020AS	05397

C11	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C12	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C13	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C14	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C15	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C16	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C17	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C18	0035656	CAPACITR 100 MF 20V SOLID TANT POL 10%	T362D107K020AS	05397
C19	0070474	CAPACITR 10 PF 1 KV CER DISC S2L 10%	DD-100	71590
C20	0070474	CAPACITR 10 PF 1 KV CER DISC S2L 10%	DD-100	71590
C21	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C22	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C23	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C24	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C25	0077965	CAPACITR 51 PF 500V SILVER MICA 2%	CD6ED510G03	14655
C26	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C27	0035656	CAPACITR 100 MF 20V SOLID TANT POL 10%	T362D107K020AS	05397
C28	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C29	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C30	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C31	0081095	CAPACITR 3.3 MF 50V CER MONO 20%	8151-050-651-335M	72982
C32	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C33	0081095	CAPACITR 3.3 MF 50V CER MONO 20%	8151-050-651-335M	72982
C34	0081095	CAPACITR 3.3 MF 50V CER MONO 20%	8151-050-651-335M	72982

DS3-DS1/DS0 DEMUX SUBASSEMBLY (A1/A1/A1) - 307223 (cont.)

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
C35	0172707	CAPACITR .068 MF 50V CER MONO	RPE122X7R683K50V	
C36	0070470	CAPACITR 10 PF 500V SILVER MICA 5%	CD15CD100J03	14655
C37	0078600	NOT ASSIGNED	FOR ENG ONLY	
C38	0035656	CAPACITR 100 MF 20V SOLID TANT POL 10%	T362D107K020AS	05397
C39	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C40	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C41	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C42	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C43	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C44	0081808	CAPACITR 2.2 MF 50V CER MONO 20%	8141-050-651-225M	72982
C45	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C46	0035656	CAPACITR 100 MF 20V SOLID TANT POL 10%	T362D107K020AS	05397
C47	0081995	CAPACITR .001 MF 100V CER MONO X7R 10%	8121-100-X7R-102K	72982
C48	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C49	0035656	CAPACITR 100 MF 20V SOLID TANT POL 10%	T362D107K020AS	05397
C50	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C51	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C52	0035656	CAPACITR 100 MF 20V SOLID TANT POL 10%	T362D107K020AS	05397
C53	0081101	CAPACITR 1 MF 50V CER MONO 20%	8131-050-651-105M	72982
C54	0070498	CAPACITR 47 PF 500V SILVER MICA 5%	CD15ED470J03	14655
C55	0070498	CAPACITR 47 PF 500V SILVER MICA 5%	CD15ED470J03	14655
C56	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C57	0035656	CAPACITR 100 MF 20V SOLID TANT POL 10%	T362D107K020AS	05397
C58	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C59	0077713	CAPACITR .005 MF 50V CER DISC Z5V-20+80%	CK-502	71590
C60	0084221	CAPACITR .022 MF 100V CER MONO X7R 10%	8131-100-X7R-223K	72982
C61	0078600	NOT ASSIGNED	FOR ENG ONLY	
C62	0083258	CAPACITR CHIP .1 MF 50V	C1813C104M5XAH	
C63	0083258	CAPACITR CHIP .1 MF 50V	C1813C104M5XAH	
C64	0083258	CAPACITR CHIP .1 MF 50V	C1813C104M5XAH	
C65	0083258	CAPACITR CHIP .1 MF 50V	C1813C104M5XAH	
C66	0083258	CAPACITR CHIP .1 MF 50V	C1813C104M5XAH	
C67	0083258	CAPACITR CHIP .1 MF 50V	C1813C104M5XAH	
C68	0083258	CAPACITR CHIP .1 MF 50V	C1813C104M5XAH	
C69	0173733	CAPACITR IC BYPASS FOR .3W 24L-DIP .03MF	UQ-24.S03	
C70	0173733	CAPACITR IC BYPASS FOR .3W 24L-DIP .03MF	UQ-24.S03	
C71	0083258	CAPACITR CHIP .1 MF 50V	C1813C104M5XAH	
C72	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
CR1	0071122	DIODE 1N914 SIL 75V 75MA	1N914	80368
CR2	0071122	DIODE 1N914 SIL 75V 75MA	1N914	80368
CR3	0071122	DIODE 1N914 SIL 75V 75MA	1N914	80368

CR4	0071122	DIODE 1N914 SIL 75V 75MA	1N914	80368
CR5	0071122	DIODE 1N914 SIL 75V 75MA	1N914	80368
DS1	0177211	LAMP LED-RSTR RED PC MT 5V 3MA	555-2007	
DS2	0177211	LAMP LED-RSTR RED PC MT 5V 3MA	555-2007	
DS3	0177211	LAMP LED-RSTR RED PC MT 5V 3MA	555-2007	
DS4	0177211	LAMP LED-RSTR RED PC MT 5V 3MA	555-2007	
DS5	0177211	LAMP LED-RSTR RED PC MT 5V 3MA	555-2007	
J1	0173712	CONN RECT 96-COND MALE PNL MT RT ANG PC	10-8457-096-002-097	
J2	0173712	CONN RECT 96-COND MALE PNL MT RT ANG PC	10-8457-096-002-097	
J3	0078600	NOT ASSIGNED	FOR ENG ONLY	
J4	0078600	NOT ASSIGNED	FOR ENG ONLY	
J5	0078600	NOT ASSIGNED	FOR ENG ONLY	
J6	0078600	NOT ASSIGNED	FOR ENG ONLY	
J7	0078600	NOT ASSIGNED	FOR ENG ONLY	
J8	0078600	NOT ASSIGNED	FOR ENG ONLY	
J9	0078600	NOT ASSIGNED	FOR ENG ONLY	
J10	0078600	NOT ASSIGNED	FOR ENG ONLY	
J11	0078600	NOT ASSIGNED	FOR ENG ONLY	
J12	0078600	NOT ASSIGNED	FOR ENG ONLY	
J13	0078600	NOT ASSIGNED	FOR ENG ONLY	
J14	0078600	NOT ASSIGNED	FOR ENG ONLY	

DS3-DS1/DS0 DEMUX SUBASSEMBLY (A1/A1/A1) - 307223 (cont.)

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
J15	0078600	NOT ASSIGNED	FOR ENG ONLY	
J16	0178481	CONN HEADER DBL ROW RT ANG 1-PIN PC	TSW-101-09-G-D-RA	
J17	0087366	CONN HEADER SGL ROW STRAIGHT 3-PIN PC	87220-3	
J18	0087366	CONN HEADER SGL ROW STRAIGHT 3-PIN PC	87220-3	
J19	0178480	CONN HEADER SGL ROW RT ANG 2-PIN PC	TSW-102-11-G-S-RA	
K1	0177023	RELAY 5VDC DPDT DIP SEALED	DF2E-DC5V	
L1	0077954	INDUCTOR .47 UH SUBMIN UNSHLD 10%	IR-2	91637
L2	0078716	INDUCTOR 100 UH SUBMIN UNSHLD 10%	IR-2	91637
L3	0174000	NOT USED ON THIS ASSEMBLY		
L4	0078716	INDUCTOR 100 UH SUBMIN UNSHLD 10%	IR-2	91637
L5	0082591	INDUCTOR .39 UH SUBMIN UNSHLD 10%	IR-2	91637
L6	0078716	INDUCTOR 100 UH SUBMIN UNSHLD 10%	IR-2	91637
L7	0078716	INDUCTOR 100 UH SUBMIN UNSHLD 10%	IR-2	91637
L8	0078716	INDUCTOR 100 UH SUBMIN UNSHLD 10%	IR-2	91637
P17	0086884	JUMPER FEMALE INSULATED .10 SPACING	65474-004	
P18	0086884	JUMPER FEMALE INSULATED .10 SPACING	65474-004	
Q1	0174224	TRANSSTR MRF 571 NPN SIL	MRF571	
Q2	0083032	TRANSSTR 2N2222A NPN SIL	2N2222A	
Q3	0079660	TRANSSTR 2N4093 FET N-CHNL JUNC	2N4093	04713
Q4	0079660	TRANSSTR 2N4093 FET N-CHNL JUNC	2N4093	04713
Q5	0083032	TRANSSTR 2N2222A NPN SIL	2N2222A	
Q6	0077148	TRANSSTR 2N3251 PNP SIL	2N3251	04713
Q7	0083032	TRANSSTR 2N2222A NPN SIL	2N2222A	
R1	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R2	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R3	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R4	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R5	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R6	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R7	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R8	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R9	0083930	RESISTOR 31.6K OHM RN55C 1% MTL FLM	RN55C3162F	
R10	0074698	RESISTOR 560 OHM 1/4W 5% COMP	RCR07G561JS	01121
R11	0074698	RESISTOR 560 OHM 1/4W 5% COMP	RCR07G561JS	01121
R12	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R13	0074714	RESISTOR 3.3K OHM 1/4W 5% COMP	RCR07G332JS	01121
R14	0071951	RESISTOR 1.0K OHM 1/4W 10% COMP	RCR07G102KS	01121

R15	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R16	0075687	RESISTOR 47K OHM 1/4W 5% COMP	RCR07G473JS	01121
R17	0074714	RESISTOR 3.3K OHM 1/4W 5% COMP	RCR07G332JS	01121
R18	0071951	RESISTOR 1.0K OHM 1/4W 10% COMP	RCR07G102KS	01121
R19	0081992	RESISTOR 22 OHM 1/4W 5% COMP	RCR07G220JS	01121
R20	0174428	RESISTOR 19.1K OHM RN55C 1%	RN55C1912F	
R21	0078700	FACTORY SELECTED VALUE	PER DISCP.	
R22	0083913	RESISTOR 7.87K OHM RN55C 1% MTL FLM	RN55C7871F	
R23	0083936	RESISTOR 48.7K OHM RN55C 1% MTL FLM	RN55C4872F	
R24	0071951	RESISTOR 1.0K OHM 1/4W 10% COMP	RCR07G102KS	01121
R25	0174417	RESISTOR 8.45K OHM RN55C 1%	RN55C8451F	
R26	0078600	NOT ASSIGNED	FOR ENG ONLY	
R27	0083903	RESISTOR 3.32K OHM RN55C 1% MTL FLM	RN55C3321F	
R28	0078929	RESISTOR 1.00K OHM RN55C 1% MTL FLM	RN55C1001F	
R29	0087838	POT 2K OHM 1/2W CER 3/8 SQ VERT ADJ 25T	3299W-1-202	
R30	0074710	RESISTOR 2.2K OHM 1/4W 5% COMP	RCR07G222JS	01121
R31	0178264	RESISTOR 9.09K OHM 1/4W 1% MF	5043ED9K090F	
R32	0079712	RESISTOR 36.5K OHM RN55C 1% MTL FLM	RN55C3652F	
R33	0083936	RESISTOR 48.7K OHM RN55C 1% MTL FLM	RN55C4872F	
R34	0082678	RESISTOR 4.7 OHM 1/4W 5% COMP	RCR07G4R7JS	01121
R35	0085745	RESISTOR 68.1 OHM RN55C 1% MTL FLM	RN55C68R1F	
R36	0075551	RESISTOR 10 OHM 1/4W 5% COMP	RCR07G100JS	01121
R37	0089522	POT 100K OHM 1/2W CER 3/8 SQ VER ADJ 25T	3299W-1-104	
R38	0074710	RESISTOR 2.2K OHM 1/4W 5% COMP	RCR07G222JS	01121

DS3-DS1/DS0 DEMUX SUBASSEMBLY (A1/A1/A1) - 307223 (cont.)

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
R39	0074735	RESISTOR 22K OHM 1/4W 5% COMP	RCR07G223JS	01121
R40	0081992	RESISTOR 22 OHM 1/4W 5% COMP	RCR07G220JS	01121
R41	0083842	RESISTOR 33.2 OHM RN55D 1% MTL FLM	RN55D33R2F	
R42	0083855	RESISTOR 105 OHM RN55C 1% MTL FLM	RN55C1050F	
R43	0081950	RESISTOR 8.2 OHM 1/4W 5% COMP	RCR07G8R2JS	01121
R44	0083854	RESISTOR 86.6 OHM RN55C 1% MTL FLM	RN55C86R6F	
R45	0083089	RESISTOR 75.0 OHM RN55C 1% MTL FLM	RN55C75R0F	
R46	0083835	RESISTOR 23.7 OHM RN55D 1% MTL FLM	RN55D23R7F	
R47	0083089	RESISTOR 75.0 OHM RN55C 1% MTL FLM	RN55C75R0F	
R48	0078915	RESISTOR 221 OHM RN55C 1% MTL FLM	RN55C2210F	
R49	0083089	RESISTOR 75.0 OHM RN55C 1% MTL FLM	RN55C75R0F	
R50	0083089	RESISTOR 75.0 OHM RN55C 1% MTL FLM	RN55C75R0F	
R51	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R52	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R53	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R54	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R55	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R56	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R57	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R58	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R59	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R60	0074735	RESISTOR 22K OHM 1/4W 5% COMP	RCR07G223JS	01121
R61	0074710	RESISTOR 2.2K OHM 1/4W 5% COMP	RCR07G222JS	01121
R62	0074710	RESISTOR 2.2K OHM 1/4W 5% COMP	RCR07G222JS	01121
R63	0074710	RESISTOR 2.2K OHM 1/4W 5% COMP	RCR07G222JS	01121
R64	0074710	RESISTOR 2.2K OHM 1/4W 5% COMP	RCR07G222JS	01121
R65	0074714	RESISTOR 3.3K OHM 1/4W 5% COMP	RCR07G332JS	01121
R66	0071951	RESISTOR 1.0K OHM 1/4W 10% COMP	RCR07G102KS	01121
R67	0071951	RESISTOR 1.0K OHM 1/4W 10% COMP	RCR07G102KS	01121
R68	0074714	RESISTOR 3.3K OHM 1/4W 5% COMP	RCR07G332JS	01121
R69	0084612	RESISTOR 4.75K OHM RN55C 1% MTL FLM	RN55C4751F	
R70	0075687	RESISTOR 47K OHM 1/4W 5% COMP	RCR07G473JS	01121
R71	0079985	RESISTOR 40.2K OHM RN55C 1% MTL FLM	RN55C4022F	
R72	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R73	0084150	RESISTOR 68K OHM 1/4W 5% COMP	RCR07G683JS	01121
R74	0084612	RESISTOR 4.75K OHM RN55C 1% MTL FLM	RN55C4751F	
R75	0078933	RESISTOR 10.0K OHM RN55C 1% MTL FLM	RN55C1002F	
R76	0087841	POT 20K OHM 1/2W CER 3/8 SQ VERT ADJ 25T	3299W-1-203	
R77	0087838	POT 2K OHM 1/2W CER 3/8 SQ VERT ADJ 25T	3299W-1-202	
R78	0081992	RESISTOR 22 OHM 1/4W 5% COMP	RCR07G220JS	01121
R79	0078929	RESISTOR 1.00K OHM RN55C 1% MTL FLM	RN55C1001F	
R80	0078600	NOT ASSIGNED	FOR ENG ONLY	

R81	0083906	RESISTOR 3.83K OHM RN55C 1% MTL FLM	RN55C3831F	
R82	0078600	NOT ASSIGNED	FOR ENG ONLY	
R84	0074714	RESISTOR 3.3K OHM 1/4W 5% COMP	RCR07G332JS	01121
R85	0079712	RESISTOR 36.5K OHM RN55C 1% MTL FLM	RN55C3652F	
R86	0083918	RESISTOR 12.7K OHM RN55C 1% MTL FLM	RN55C1272F	
R87	0074710	RESISTOR 2.2K OHM 1/4W 5% COMP	RCR07G222JS	01121
R88	0074735	RESISTOR 22K OHM 1/4W 5% COMP	RCR07G223JS	01121
R89	0074710	RESISTOR 2.2K OHM 1/4W 5% COMP	RCR07G222JS	01121
R90	0078600	NOT ASSIGNED	FOR ENG ONLY	
R91	0081992	RESISTOR 22 OHM 1/4W 5% COMP	RCR07G220JS	01121
R92	0081992	RESISTOR 22 OHM 1/4W 5% COMP	RCR07G220JS	01121
R93	0083797	RESISTOR 71.5 OHM RN55C 1% MTL FLM	RN55C71R5F	
R94	0083085	RESISTOR 45.3 OHM RN55C 1% MTL FLM	RN55C45R3F	
R95	0083797	RESISTOR 71.5 OHM RN55C 1% MTL FLM	RN55C71R5F	
R96	0078929	RESISTOR 1.00K OHM RN55C 1% MTL FLM	RN55C1001F	
R97	0083038	RESISTOR 6.81K OHM RN55C 1% MTL FLM	RN55C6811F	
R98	0078929	RESISTOR 1.00K OHM RN55C 1% MTL FLM	RN55C1001F	
R99	0079863	RESISTOR 1.21K OHM RN55C 1% MTL FLM	RN55C1211F	
R100	0079863	RESISTOR 1.21K OHM RN55C 1% MTL FLM	RN55C1211F	
R101	0074706	RESISTOR 1.5K OHM 1/4W 5% COMP	RCR07G152JS	01121
R102	0077672	RESISTOR 33K OHM 1/4W 5% COMP	RCR07G333JS	01121
R103	0077592	RESISTOR 120 OHM 1/4W 5% COMP	RCR07G121JS	01121
R104	0083911	RESISTOR 5.62K OHM RN55C 1% MTL FLM	RN55C5621F	
R105	0074703	RESISTOR 1.2K OHM 1/4W 5% COMP	RCR07G122JS	01121

DS3-DS1/DS0 DEMUX SUBASSEMBLY (A1/A1/A1) - 307223 (cont.)

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
R106	0078929	RESISTOR 1.00K OHM RN55C 1% MTL FLM	RN55C1001F	
R107	0078929	RESISTOR 1.00K OHM RN55C 1% MTL FLM	RN55C1001F	
R108	0083097	RESISTOR 332 OHM RN55C 1% MTL FLM	RN55C3320F	
R109	0078929	RESISTOR 1.00K OHM RN55C 1% MTL FLM	RN55C1001F	
R110	0084612	RESISTOR 4.75K OHM RN55C 1% MTL FLM	RN55C4751F	
R111	0078930	RESISTOR 2.21K OHM RN55C 1% MTL FLM	RN55C2211F	
R112	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R113	0074723	RESISTOR 5.6K OHM 1/4W 5% COMP	RCR07G562JS	01121
R114	0079128	RESISTOR 768 OHM RN55C 1% MTL FLM	RN55C7680F	
R115	0079128	RESISTOR 768 OHM RN55C 1% MTL FLM	RN55C7680F	
R116	0084612	RESISTOR 4.75K OHM RN55C 1% MTL FLM	RN55C4751F	
R117	0079725	RESISTOR 3.16K OHM RN55C 1% MTL FLM	RN55C3161F	
R117	0088332	RESISTOR 1.74K OHMS RN55C 1% MTL FLM	RN55C1741F	
R117	0174956	RES 2.87K OHM 1/4W 1% MTL FLM	CCF-552871F	
R117	0178248	RESISTOR 2.00K OHM 1/4W 1% MF	5043ED2K000F	
R117	0178249	RESISTOR 2.21K OHM 1/4W 1% MF	5043ED2K210F	
R117	0178250	RESISTOR 2.49K OHM 1/4W 1% MF	5043ED2K490F	
R117	0178251	RESISTOR 3.01K OHM 1/4W 1% MF	5043ED3K010F	
R117	0178252	RESISTOR 3.32K OHM 1/4W 1% MF	5043ED3K320F	
R118	0071917	RESISTOR 330 OHM 1/4W 5% COMP	RCR07G331JS	01121
R119	0071917	RESISTOR 330 OHM 1/4W 5% COMP	RCR07G331JS	01121
T1	0177027	XFMR 1;1.37CT PRI L 680UH	2745C	
T2	0177027	XFMR 1;1.37CT PRI L 680UH	2745C	
T3	0309104	TRANSFORMER MINATURE AUDIO		
T4	0078600	NOT ASSIGNED	FOR ENG ONLY	
TP1	0082909	TERMINAL PRESS MT DISCONNECT .058-PIN	60599-1	00779
TP2	0082909	TERMINAL PRESS MT DISCONNECT .058-PIN	60599-1	00779
U1	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U2	0327877	IC FRAMER		
U3	0327878	IC PATTERN GENERATOR		
U4	0327877	IC FRAMER		
U5	0327876	IC CLOCK REC DIGITAL		
U6	0170206	IC ECL TRANSLATOR TTL TO ECL QUAD	F10124DC	
U7	0177934	IC CMOS GATE AND 2-IN QUAD	74ACT08PC	
U8	0172179	IC COMPARATOR - VOLTAGE 8L - DIP DUAL	LM393N	
U9	0327875	IC DS1/1C/2/3 ANALOG CLOCK REC		
U10	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U11	0177252	IC CMOS CNTR 8-BIT BINARY	SN74HC590AN	
U12	0177252	IC CMOS CNTR 8-BIT BINARY	SN74HC590AN	

U13	0177252	IC CMOS CNTR 8-BIT BINARY	SN74HC590AN	
U14	0176276	IC MEM CMOS FIFO 64X4 ASYNC	CY7C403-25PC	
U15	0173221	IC CMOS GATE NAND 2-IN QUAD	MM74HC00N	
U16	0174227	IC CMOS LATCH 8-BIT ADDRESSABL	MM744C259N	
U17	0327878	IC PATTERN GENERATOR		
U18	0327877	IC FRAMER		
U19	0327876	IC CLOCK REC DIGITAL		
U20	0172455	IC CMOS GATE AND 2-IN QUAD	MM74HC08N	
U21	0081658	IC TTL BUFFER HEX OPEN-COL	SN7407N	01295
U22	0089590	RESISTOR NETWORK 5 4.7K OHM 2% 6 SIP	4306R-101-472	
U23	0086514	IC OP AMP JFET 8L-DIP 70C COMP DUAL	TL082ACP	
U24	0327875	IC DS1/1C/2/3 ANALOG CLOCK REC		
U25	0177105	IC PLL 18 MHZ 16L-DIP	MM74HC4046N	
U26	0355983	IC CMOS INVERTER HEX UNBUFFER		
U27	0176744	OPT-ISLR 1.5KV PK FET PHODETR	H11F1	
U28	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U29	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U30	0330210	IC CMOS FLIP-FLOP TYPE-D	MC74HC374N	
U31	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U32	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U33	0177002	IC CMOS BUFFER 10-BIT NONINVRT	AM29C827PC	
U34	0177003	IC CMOS TRANSCVR BUS 10-BIT	AM29C861/BLA	
U35	0177003	IC CMOS TRANSCVR BUS 10-BIT	AM29C861/BLA	
U36	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	

DS3-DS1/DS0 DEMUX SUBASSEMBLY (A1/A1/A1) - 307223 (cont.)

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
U37	0177002	IC CMOS BUFFER 10-BIT NONINVRT	AM29C827PC	
U38	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U39	0176276	IC MEM CMOS FIFO 64X4 ASYNC	CY7C403-25PC	
U40	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U41	0177104	IC PCM ENCDR/DCDR WITH FILTERS	TCM2913J	
W1	0306222	CABLE 5.5 IN CHABIN	981616-020-005.50	
XU1	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU2	0177011	SOCKET 68 POS PLCC PC MT	PLCC-68-P-T	
XU3	0177011	SOCKET 68 POS PLCC PC MT	PLCC-68-P-T	
XU4	0177011	SOCKET 68 POS PLCC PC MT	PLCC-68-P-T	
XU5	0177011	SOCKET 68 POS PLCC PC MT	PLCC-68-P-T	
XU9	0177092	SOCKET 44 POS PLCC PC MT	PLCC-44-P-T	
XU10	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU17	0177011	SOCKET 68 POS PLCC PC MT	PLCC-68-P-T	
XU18	0177011	SOCKET 68 POS PLCC PC MT	PLCC-68-P-T	
XU19	0177011	SOCKET 68 POS PLCC PC MT	PLCC-68-P-T	
XU24	0177092	SOCKET 44 POS PLCC PC MT	PLCC-44-P-T	
XU28	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU29	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU30	0086897	SOCKET 20-PIN DIP PC MT	ICT-203-S-T	
XU31	0177349	SOCKET 32-PIN PCMT 6-LEAD SPACE	ICT-326-S-TG	
XU32	0177349	SOCKET 32-PIN PCMT 6-LEAD SPACE	ICT-326-S-TG	
XU33	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU34	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU35	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU36	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU37	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU38	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU40	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU41	0086897	SOCKET 20-PIN DIP PC MT	ICT-203-S-T	
Y1	0318996	CRYSTAL 1.544 MHZ SERIES .002%	PER SA DWG 318996	
Z1	0327940	HYBRID 75 OHM DSX - 3	PER SA DWEG 327940	
Z2	0327944	HYBRID 100 OHM DS1 OUTPUT	PER SA DWG 327944	

ANALOG DTA ASSEMBLY (A1/A2) - 327996

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
1	0327989	SUB-ASSY ANALOG PWB	1.00	
2	0082463	EXTRACTOR PC BOARD	5005-08N	13103
3	0457032	EPROM &LABEL SET ANALOG		
J11	0174930	CONN HEADER SGL ROW STRAIGHT 3-PIN LK	MLSS100-3	
J13	0174930	CONN HEADER SGL ROW STRAIGHT 3-PIN LK	MLSS100-3	
J14	0084940	CONN COAX SMB MALE PC MT 75 OHM	51-151-0000	98291
J16	0084940	CONN COAX SMB MALE PC MT 75 OHM	51-151-0000	98291
U24	0309652	ASSY PAL PROGRAM U24 ANALOG		
U25	0309653	ASSY PAL PROGRAM U25 ANALOG		
U26	0309654	ASSY PAL PROGRAM U26 ANALOG		
U33	0309655	ASSY PAL PROGRAM U33 ANALOG		
U38	0309656	ASSY PAL PROGRAM U38 ANALOG		
U39	0309657	ASSY PAL PROGRAM U39 ANALOG		
W2	0456952	CABLE ASSY ANALOG/DEMUX W2		
W3	0456953	CABLE ASSY ANALOG/DEMUX W3		

ANALOG SUBASSEMBLY (A1/A2/A1) - 327989

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
BB1	0177237	BUS DSTRBTN 3-LYR VERT MT DIP	QV-3 4.10.1.2 (.2)	
BB2	0177237	BUS DSTRBTN 3-LYR VERT MT DIP	QV-3 4.10.1.2 (.2)	
BB3	0177102	BUS DSTRBTN 2-LYR VERT MT DIP	QV-2 17.6.3 (.1)	
C1	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C2	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C3	0086283	CAPACITR .01 MF 250V POLYCARB	B32540C.01/5/250	
C4	0081098	CAPACITR .47 MF 50V CER MONO 20%	8131-050-651-474M	72982
C5	0035656	CAPACITR 100 MF 20V SOLID TANT POL 10%	T362D107K020AS	05397
C6	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C7	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C8	0035654	CAPACITR 10 MF 25V SOLID TANT POL 10%	T362B106K025AS	05397
C9	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982

C10	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C11	0081210	CAPACITR .01 MF 50V CER MONO X7R 10%	RPE121X7R103K50V	72982
C12	0081210	CAPACITR .01 MF 50V CER MONO X7R 10%	RPE121X7R103K50V	72982
C13	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C14	0078600	NOT ASSIGNED	FOR ENG ONLY	
C15	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C16	0035654	CAPACITR 10 MF 25V SOLID TANT POL 10%	T362B106K025AS	05397
C17	0070536	CAPACITR 390 PF 500V SILVER MICA 5%	CD15FD391J03	14655
C18	0070522	CAPACITR 150 PF 500V SILVER MICA 5%	CD15FD151J03	14655
C19	0073493	CAPACITR 18 PF 500V SILVER MICA 5%	CD15CD180J03	14655
C20	0070498	CAPACITR 47 PF 500V SILVER MICA 5%	CD15ED470J03	14655
C21	0084820	CAPACITR 150 MF 15V SOLID TANT POL AGED	T362D157K015AS W/DOT	05397
C22	0035654	CAPACITR 10 MF 25V SOLID TANT POL 10%	T362B106K025AS	05397
C23	0081098	CAPACITR .47 MF 50V CER MONO 20%	8131-050-651-474M	72982
C24	0070531	CAPACITR 270 PF 500V SILVER MICA 5%	CD15FD271J03	14655
C25	0035654	CAPACITR 10 MF 25V SOLID TANT POL 10%	T362B106K025AS	05397
C26	0084820	CAPACITR 150 MF 15V SOLID TANT POL AGED	T362D157K015AS W/DOT	05397
C27	0084820	CAPACITR 150 MF 15V SOLID TANT POL AGED	T362D157K015AS W/DOT	05397
C28	0035654	CAPACITR 10 MF 25V SOLID TANT POL 10%	T362B106K025AS	05397
C29	0035654	CAPACITR 10 MF 25V SOLID TANT POL 10%	T362B106K025AS	05397
C30	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C31	0081098	CAPACITR .47 MF 50V CER MONO 20%	8131-050-651-474M	72982
C32	0070531	CAPACITR 270 PF 500V SILVER MICA 5%	CD15FD271J03	14655
C33	0035654	CAPACITR 10 MF 25V SOLID TANT POL 10%	T362B106K025AS	05397

ANALOG SUBASSEMBLY (A1/A2/A1) - 327989 (cont.)

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
C34	0035654	CAPACITR 10 MF 25V SOLID TANT POL 10%	T362B106K025AS	05397
C35	0035654	CAPACITR 10 MF 25V SOLID TANT POL 10%	T362B106K025AS	05397
C36	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C37	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C38	0070518	CAPACITR 100 PF 1KV CER DISC S3N 10%	DD-101	71590
C39	0070518	CAPACITR 100 PF 1KV CER DISC S3N 10%	DD-101	71590
C40	0081210	CAPACITR .01 MF 50V CER MONO X7R 10%	RPE121X7R103K50V	72982
C41	0081210	CAPACITR .01 MF 50V CER MONO X7R 10%	RPE121X7R103K50V	72982
C42	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C43	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C44	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C45	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C46	0174000	NOT USED ON THIS ASSEMBLY		
C47	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C48	0174000	NOT USED ON THIS ASSEMBLY		
C49	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C50	0078600	NOT ASSIGNED	FOR ENG ONLY	
C51	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C52	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C53	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C54	0081792	CAPACITR 30 PF 100V CER DISC U1G 5%	805-024-U1G0-300J	72982
C55	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C56	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C57	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C58	0081792	CAPACITR 30 PF 100V CER DISC U1G 5%	805-024-U1G0-300J	72982
C59	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C60	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C61	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C62	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C63	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C64	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C65	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C66	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C67	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C68	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C69	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C70	0035656	CAPACITR 100 MF 20V SOLID TANT POL 10%	T362D107K020AS	05397
C71	0035656	CAPACITR 100 MF 20V SOLID TANT POL 10%	T362D107K020AS	05397
C72	0035656	CAPACITR 100 MF 20V SOLID TANT POL 10%	T362D107K020AS	05397
C73	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C74	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C75	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982

C76	0078600	NOT ASSIGNED	FOR ENG ONLY	
C77	0173733	CAPACITR IC BYPASS FOR .3W 24L-DIP .03MF	UQ-24.S03	
C78	0173733	CAPACITR IC BYPASS FOR .3W 24L-DIP .03MF	UQ-24.S03	
C79	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C80	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C81	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C82	0081210	CAPACITR .01 MF 50V CER MONO X7R 10%	RPE121X7R103K50V	72982
C83	0081210	CAPACITR .01 MF 50V CER MONO X7R 10%	RPE121X7R103K50V	72982
C84	0174000	NOT USED ON THIS ASSEMBLY		
C85	0174000	NOT USED ON THIS ASSEMBLY		
C86	0174000	NOT USED ON THIS ASSEMBLY		
C87	0081931	CAPACITR 15 PF 500V CER DISC COG 5%	831-COGO-150J	72982
C88	0081931	CAPACITR 15 PF 500V CER DISC COG 5%	831-COGO-150J	72982
C89	0035654	CAPACITR 10 MF 25V SOLID TANT POL 10%	T362B106K025AS	05397
C90	0078600	NOT ASSIGNED	FOR ENG ONLY	
C91	0081251	CAPACITR 56 PF 1 KV CER DISC S3N 10%	DD560	71590
CR1	0083618	DIODE 5082-2800 DET UHF SCHOTTKY	5082-2800	28480
CR2	0083618	DIODE 5082-2800 DET UHF SCHOTTKY	5082-2800	28480
CR3	0083618	DIODE 5082-2800 DET UHF SCHOTTKY	5082-2800	28480
CR4	0083618	DIODE 5082-2800 DET UHF SCHOTTKY	5082-2800	28480
DS1	0177211	LAMP LED-RSTR RED PC MT 5V 3MA	555-2007	

ANALOG SUBASSEMBLY (A1/A2/A1) - 327989 (cont.)

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
E1	0177971	CHOKE WIDE-BAND 3B .236X394L	VK20009-3B	
E2	0177971	CHOKE WIDE-BAND 3B .236X394L	VK20009-3B	
E3	0177971	CHOKE WIDE-BAND 3B .236X394L	VK20009-3B	
E4	0081766	CORE BEAD FERRITE 14 .145X.039X.150L RED	57-1829	78488
J1	0173712	CONN RECT 96-COND MALE PNL MT RT ANG PC	10-8457-096-002-097	
J2	0173712	CONN RECT 96-COND MALE PNL MT RT ANG PC	10-8457-096-002-097	
J3	0174000	NOT USED ON THIS ASSEMBLY		
J4	0174000	NOT USED ON THIS ASSEMBLY		
J5	0087229	CONN HEADER SGL ROW STRAIGHT 2-PIN PC	87220-2	
J7	0087229	CONN HEADER SGL ROW STRAIGHT 2-PIN PC	87220-2	
J8	0087229	CONN HEADER SGL ROW STRAIGHT 2-PIN PC	87220-2	
J9	0177085	CONN HEADER SGL ROW RT A 4-PIN	TSW-104-16-S-S-RA	
J10	0174000	NOT USED ON THIS ASSEMBLY		
J11	0174000	NOT USED ON THIS ASSEMBLY		
J12	0174000	NOT USED ON THIS ASSEMBLY		
J13	0174000	NOT USED ON THIS ASSEMBLY		
J14	0174000	NOT USED ON THIS ASSEMBLY		
J15	0174000	NOT USED ON THIS ASSEMBLY		
J16	0174000	NOT USED ON THIS ASSEMBLY		
J17	0174000	NOT USED ON THIS ASSEMBLY		
J18	0078600	NOT ASSIGNED	FOR ENG ONLY	
J19	0174000	NOT USED ON THIS ASSEMBLY		
J20	0174000	NOT USED ON THIS ASSEMBLY		
J21	0087229	CONN HEADER SGL ROW STRAIGHT 2-PIN PC	87220-2	
J22	0087229	CONN HEADER SGL ROW STRAIGHT 2-PIN PC	87220-2	
J23	0087229	CONN HEADER SGL ROW STRAIGHT 2-PIN PC	87220-2	
L2	0080804	INDUCTOR 1.0 UH MIN SHLD MOLDED 10%	155-1ROK	09021
L3	0080803	INDUCTOR .68 UH MIN SHLD 10%		09021
L4	0080803	INDUCTOR .68 UH MIN SHLD 10%		09021
L5	0080803	INDUCTOR .68 UH MIN SHLD 10%		09021
L6	0078716	INDUCTOR 100 UH SUBMIN UNSHLD 10%	IR-2	91637
L7	0079558	INDUCTOR .33 UH SUBMIN SHLD ENCAP 10%	WEE-WEE-.33	72259
L8	0078716	INDUCTOR 100 UH SUBMIN UNSHLD 10%	IR-2	91637
L9	0086100	PWB PRINTED COMPONENT	PER S A DWG	
L10	0086100	PWB PRINTED COMPONENT	PER S A DWG	
L11	0079142	INDUCTOR .22 UH SUBMIN SHLD	WEE-WEE .22	72259
L12	0086100	PWB PRINTED COMPONENT	PER S A DWG	
Q1	0177028	TRANSSTR 2N7000 FET N-CHNL	2N7000	
Q2	0075091	TRANSSTR 2N2857 NPN SIL	2N2857	04713

Q3	0075091	TRANSSTR 2N2857 NPN SIL	2N2857	04713
Q4	0177491	TRANSSTR MRF-536 PND SIL	MRF 536	
Q5	0083032	TRANSSTR 2N2222A NPN SIL	2N2222A	
Q6	0083032	TRANSSTR 2N2222A NPN SIL	2N2222A	
Q7	0083032	TRANSSTR 2N2222A NPN SIL	2N2222A	
Q8	0083032	TRANSSTR 2N2222A NPN SIL	2N2222A	
Q9	0075091	TRANSSTR 2N2857 NPN SIL	2N2857	04713
Q10	0083032	TRANSSTR 2N2222A NPN SIL	2N2222A	
Q11	0083032	TRANSSTR 2N2222A NPN SIL	2N2222A	
Q12	0077148	TRANSSTR 2N3251 PNP SIL	2N3251	04713
Q13	0177028	TRANSSTR 2N7000 FET N-CHNL	2N7000	
Q14	0077148	TRANSSTR 2N3251 PNP SIL	2N3251	04713
Q15	0083032	TRANSSTR 2N2222A NPN SIL	2N2222A	
Q16	0083032	TRANSSTR 2N2222A NPN SIL	2N2222A	
Q17	0077148	TRANSSTR 2N3251 PNP SIL	2N3251	04713
Q18	0077148	TRANSSTR 2N3251 PNP SIL	2N3251	04713
Q19	0077148	TRANSSTR 2N3251 PNP SIL	2N3251	04713
Q20	0078850	TRANSSTR 2N2219 NPN SIL	2N2219	13715
Q21	0078850	TRANSSTR 2N2219 NPN SIL	2N2219	13715
Q22	0083032	TRANSSTR 2N2222A NPN SIL	2N2222A	
Q23	0083032	TRANSSTR 2N2222A NPN SIL	2N2222A	
Q24	0174224	TRANSSTR MRF 571 NPN SIL	MRF571	
Q25	0075091	TRANSSTR 2N2857 NPN SIL	2N2857	04713
Q26	0174224	TRANSSTR MRF 571 NPN SIL	MRF571	

ANALOG SUBASSEMBLY (A1/A2/A1) - 327989 (cont.)

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
Q27	0077148	TRANSSTR 2N3251 PNP SIL	2N3251	04713
Q28	0174224	TRANSSTR MRF 571 NPN SIL	MRF571	
Q29	0174224	TRANSSTR MRF 571 NPN SIL	MRF571	
Q30	0077148	TRANSSTR 2N3251 PNP SIL	2N3251	04713
Q31	0174224	TRANSSTR MRF 571 NPN SIL	MRF571	
Q32	0174224	TRANSSTR MRF 571 NPN SIL	MRF571	
Q33	0174224	TRANSSTR MRF 571 NPN SIL	MRF571	
Q34	0177028	TRANSSTR 2N7000 FET N-CHNL	2N7000	
Q35	0077148	TRANSSTR 2N3251 PNP SIL	2N3251	04713
Q36	0075091	TRANSSTR 2N2857 NPN SIL	2N2857	04713
Q37	0075091	TRANSSTR 2N2857 NPN SIL	2N2857	04713
Q38	0174224	TRANSSTR MRF 571 NPN SIL	MRF571	
Q39	0174224	TRANSSTR MRF 571 NPN SIL	MRF571	
R1	0075687	RESISTOR 47K OHM 1/4W 5% COMP	RCR07G473JS	01121
R2	0074735	RESISTOR 22K OHM 1/4W 5% COMP	RCR07G223JS	01121
R3	0074735	RESISTOR 22K OHM 1/4W 5% COMP	RCR07G223JS	01121
R4	0075584	RESISTOR 47 OHM 1/4W 5% COMP	RCR07G470JS	01121
R5	0075584	RESISTOR 47 OHM 1/4W 5% COMP	RCR07G470JS	01121
R6	0074727	RESISTOR 10K OHM 1/4W 5% COMP	RCR07G103JS	01121
R7	0074675	RESISTOR 100 OHM 1/4W 5% COMP	RCR07G101JS	01121
R8	0074698	RESISTOR 560 OHM 1/4W 5% COMP	RCR07G561JS	01121
R9	0083876	RESISTOR 499 OHM RN55C 1% MTL FLM	RN55C4990F	
R10	0083899	RESISTOR 2.26K OHM RN55C 1% MTL FLM	RN55C2261F	
R11	0075584	RESISTOR 47 OHM 1/4W 5% COMP	RCR07G470JS	01121
R12	0083902	RESISTOR 3.01K OHM RN55C 1% MTL FLM	RN55C3011F	
R13	0083902	RESISTOR 3.01K OHM RN55C 1% MTL FLM	RN55C3011F	
R14	0078929	RESISTOR 1.00K OHM RN55C 1% MTL FLM	RN55C1001F	
R15	0074675	RESISTOR 100 OHM 1/4W 5% COMP	RCR07G101JS	01121
R16	0074698	RESISTOR 560 OHM 1/4W 5% COMP	RCR07G561JS	01121
R17	0083904	RESISTOR 3.48K OHM RN55C 1% MTL FLM	RN55C3481F	
R18	0083904	RESISTOR 3.48K OHM RN55C 1% MTL FLM	RN55C3481F	
R19	0074698	RESISTOR 560 OHM 1/4W 5% COMP	RCR07G561JS	01121
R20	0074675	RESISTOR 100 OHM 1/4W 5% COMP	RCR07G101JS	01121
R21	0074698	RESISTOR 560 OHM 1/4W 5% COMP	RCR07G561JS	01121
R22	0074698	RESISTOR 560 OHM 1/4W 5% COMP	RCR07G561JS	01121
R23	0074696	RESISTOR 470 OHM 1/4W 5% COMP	RCR07G471JS	01121
R24	0083865	RESISTOR 215 OHM RN55C 1% MTL FLM	RN55C2150F	
R25	0083096	RESISTOR 267 OHM RN55C 1% MTL FLM	RN55C2670F	
R26	0083882	RESISTOR 909 OHM RN55C 1% MTL FLM	RN55C9090F	
R27	0083891	RESISTOR 1.50K OHM RN55C 1% MTL FLM	RN55C1501F	
R28	0083891	RESISTOR 1.50K OHM RN55C 1% MTL FLM	RN55C1501F	

R29	0074698	RESISTOR 560 OHM 1/4W 5% COMP	RCR07G561JS	01121
R30	0081992	RESISTOR 22 OHM 1/4W 5% COMP	RCR07G220JS	01121
R31	0078929	RESISTOR 1.00K OHM RN55C 1% MTL FLM	RN55C1001F	
R32	0078918	RESISTOR 806 OHM RN55C 1% MTL FLM	RN55C8060F	
R33	0078929	RESISTOR 1.00K OHM RN55C 1% MTL FLM	RN55C1001F	
R34	0078918	RESISTOR 806 OHM RN55C 1% MTL FLM	RN55C8060F	
R35	0083875	RESISTOR 487 OHM RN55C 1% MTL FLM	RN55C4870F	
R36	0074698	RESISTOR 560 OHM 1/4W 5% COMP	RCR07G561JS	01121
R37	0074698	RESISTOR 560 OHM 1/4W 5% COMP	RCR07G561JS	01121
R38	0074698	RESISTOR 560 OHM 1/4W 5% COMP	RCR07G561JS	01121
R39	0083801	RESISTOR 150 OHM RN55C 1% MTL FLM	RN55C1500F	
R40	0083089	RESISTOR 75.0 OHM RN55C 1% MTL FLM	RN55C75R0F	
R41	0079118	RESISTOR 100 OHM RN55C 1% MTL FLM	RN55C1000F	
R42	0081992	RESISTOR 22 OHM 1/4W 5% COMP	RCR07G220JS	01121
R43	0083842	RESISTOR 33.2 OHM RN55D 1% MTL FLM	RN55D33R2F	
R44	0083853	RESISTOR 82.5 OHM RN55C 1% MTL FLM	RN55C82R5F	
R45	0075551	RESISTOR 10 OHM 1/4W 5% COMP	RCR07G100JS	01121
R46	0079713	RESISTOR 2.00K OHM RN55C 1% MTL FLM	RN55C2001F	
R47	0074675	RESISTOR 100 OHM 1/4W 5% COMP	RCR07G101JS	01121
R48	0083856	RESISTOR 110 OHM RN55C 1% MTL FLM	RN55C1100F	
R49	0083901	RESISTOR 2.61K OHM RN55C 1% MTL FLM	RN55C2611F	
R50	0083854	RESISTOR 86.6 OHM RN55C 1% MTL FLM	RN55C86R6F	
R51	0074711	RESISTOR 2.7K OHM 1/4W 5% COMP	RCR07G272JS	01121
R52	0083885	RESISTOR 1.10K OHM RN55C 1% MTL FLM	RN55C1101F	

ANALOG SUBASSEMBLY (A1/A2/A1) - 327989 (cont.)

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
R53	0078927	RESISTOR 1.65K OHM RN55C 1% MTL FLM	RN55C1651F	
R54	0074702	RESISTOR 1.0K OHM 1/4W 5% COMP	RCR07G102JS	01121
R55	0079118	RESISTOR 100 OHM RN55C 1% MTL FLM	RN55C1000F	
R56	0083840	RESISTOR 30.1 OHM RN55D 1% MTL FLM	RN55D30R1F	
R57	0079116	RESISTOR 40.2 OHM RN55D 1% MTL FLM	RN55D40R2F	
R58	0075551	RESISTOR 10 OHM 1/4W 5% COMP	RCR07G100JS	01121
R59	0074702	RESISTOR 1.0K OHM 1/4W 5% COMP	RCR07G102JS	01121
R60	0075551	RESISTOR 10 OHM 1/4W 5% COMP	RCR07G100JS	01121
R61	0083090	RESISTOR 90.9 OHM RN55C 1% MTL FLM	RN55C90R9F	
R62	0083853	RESISTOR 82.5 OHM RN55C 1% MTL FLM	RN55C82R5F	
R63	0074696	RESISTOR 470 OHM 1/4W 5% COMP	RCR07G471JS	01121
R64	0074702	RESISTOR 1.0K OHM 1/4W 5% COMP	RCR07G102JS	01121
R65	0074706	RESISTOR 1.5K OHM 1/4W 5% COMP	RCR07G152JS	01121
R66	0079118	RESISTOR 100 OHM RN55C 1% MTL FLM	RN55C1000F	
R67	0083840	RESISTOR 30.1 OHM RN55D 1% MTL FLM	RN55D30R1F	
R68	0079116	RESISTOR 40.2 OHM RN55D 1% MTL FLM	RN55D40R2F	
R69	0175427	RESISTOR 69.8 OHM RN55C 1% MTL FLM	RN55C69R8F	
R70	0083853	RESISTOR 82.5 OHM RN55C 1% MTL FLM	RN55C82R5F	
R71	0083090	RESISTOR 90.9 OHM RN55C 1% MTL FLM	RN55C90R9F	
R72	0078929	RESISTOR 1.00K OHM RN55C 1% MTL FLM	RN55C1001F	
R73	0074696	RESISTOR 470 OHM 1/4W 5% COMP	RCR07G471JS	01121
R74	0083872	RESISTOR 348 OHM RN55C 1% MTL FLM	RN55C3480F	
R75	0071843	RESISTOR 15 OHM 1/2W 10% COMP	RCR20G150KS	01121
R76	0071847	RESISTOR 18 OHM 1/2W 10% COMP	RCR20G180KS	01121
R77	0083826	RESISTOR 15.0 OHM RN55D 1% MTL FLM	RN55D15R0F	
R78	0079126	RESISTOR 604 OHM RN55C 1% MTL FLM	RN55C6040F	
R79	0083872	RESISTOR 348 OHM RN55C 1% MTL FLM	RN55C3480F	
R80	0079126	RESISTOR 604 OHM RN55C 1% MTL FLM	RN55C6040F	
R81	0083826	RESISTOR 15.0 OHM RN55D 1% MTL FLM	RN55D15R0F	
R82	0074702	RESISTOR 1.0K OHM 1/4W 5% COMP	RCR07G102JS	01121
R83	0074702	RESISTOR 1.0K OHM 1/4W 5% COMP	RCR07G102JS	01121
R84	0079118	RESISTOR 100 OHM RN55C 1% MTL FLM	RN55C1000F	
R85	0083800	RESISTOR 115 OHM RN55C 1% MTL FLM	RN55C1150F	
R86	0079129	RESISTOR 787 OHM RN55C 1% MTL FLM	RN55C7870F	
R87	0074698	RESISTOR 560 OHM 1/4W 5% COMP	RCR07G561JS	01121
R88	0174949	RESISTOR 10.0K OHM 1/4W 1% MTL FLM	CCF-551002F	
R89	0074675	RESISTOR 100 OHM 1/4W 5% COMP	RCR07G101JS	01121
R90	0074675	RESISTOR 100 OHM 1/4W 5% COMP	RCR07G101JS	01121
R91	0074735	RESISTOR 22K OHM 1/4W 5% COMP	RCR07G223JS	01121
R92	0074735	RESISTOR 22K OHM 1/4W 5% COMP	RCR07G223JS	01121
R93	0078924	RESISTOR 20.0K OHM RN55C 1% MTL FLM	RN55C2002F	
R94	0078933	RESISTOR 10.0K OHM RN55C 1% MTL FLM	RN55C1002F	

R95	0078924	RESISTOR 20.0K OHM RN55C 1% MTL FLM	RN55C2002F	
R96	0074675	RESISTOR 100 OHM 1/4W 5% COMP	RCR07G101JS	01121
R97	0078924	RESISTOR 20.0K OHM RN55C 1% MTL FLM	RN55C2002F	
R98	0078933	RESISTOR 10.0K OHM RN55C 1% MTL FLM	RN55C1002F	
R99	0078924	RESISTOR 20.0K OHM RN55C 1% MTL FLM	RN55C2002F	
R100	0074735	RESISTOR 22K OHM 1/4W 5% COMP	RCR07G223JS	01121
R101	0074735	RESISTOR 22K OHM 1/4W 5% COMP	RCR07G223JS	01121
R102	0083873	RESISTOR 422 OHM RN55C 1% MTL FLM	RN55C4220F	
R103	0083873	RESISTOR 422 OHM RN55C 1% MTL FLM	RN55C4220F	
R104	0083875	RESISTOR 487 OHM RN55C 1% MTL FLM	RN55C4870F	
R105	0074696	RESISTOR 470 OHM 1/4W 5% COMP	RCR07G471JS	01121
R106	0083865	RESISTOR 215 OHM RN55C 1% MTL FLM	RN55C2150F	
R107	0083096	RESISTOR 267 OHM RN55C 1% MTL FLM	RN55C2670F	
R108	0083882	RESISTOR 909 OHM RN55C 1% MTL FLM	RN55C9090F	
R109	0079713	RESISTOR 2.00K OHM RN55C 1% MTL FLM	RN55C2001F	
R110	0079713	RESISTOR 2.00K OHM RN55C 1% MTL FLM	RN55C2001F	
R111	0083842	RESISTOR 33.2 OHM RN55D 1% MTL FLM	RN55D33R2F	
R112	0078700	FACTORY SELECTED VALUE	PER DISCP.	
R113	0174949	RESISTOR 10.0K OHM 1/4W 1% MTL FLM	CCF-551002F	
R114	0083853	RESISTOR 82.5 OHM RN55C 1% MTL FLM	RN55C82R5F	
R115	0078929	RESISTOR 1.00K OHM RN55C 1% MTL FLM	RN55C1001F	
R116	0075551	RESISTOR 10 OHM 1/4W 5% COMP	RCR07G100JS	01121
R117	0083901	RESISTOR 2.61K OHM RN55C 1% MTL FLM	RN55C2611F	
R118	0075551	RESISTOR 10 OHM 1/4W 5% COMP	RCR07G100JS	01121

ANALOG SUBASSEMBLY (A1/A2/A1) - 327989 (cont.)

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
R119	0074711	RESISTOR 2.7K OHM 1/4W 5% COMP	RCR07G272JS	01121
R120	0083885	RESISTOR 1.10K OHM RN55C 1% MTL FLM	RN55C1101F	
R121	0078927	RESISTOR 1.65K OHM RN55C 1% MTL FLM	RN55C1651F	
R122	0083800	RESISTOR 115 OHM RN55C 1% MTL FLM	RN55C1150F	
R123	0074702	RESISTOR 1.0K OHM 1/4W 5% COMP	RCR07G102JS	01121
R124	0083842	RESISTOR 33.2 OHM RN55D 1% MTL FLM	RN55D33R2F	
R125	0074675	RESISTOR 100 OHM 1/4W 5% COMP	RCR07G101JS	01121
R126	0083856	RESISTOR 110 OHM RN55C 1% MTL FLM	RN55C1100F	
R127	0075551	RESISTOR 10 OHM 1/4W 5% COMP	RCR07G100JS	01121
R128	0074696	RESISTOR 470 OHM 1/4W 5% COMP	RCR07G471JS	01121
R129	0079116	RESISTOR 40.2 OHM RN55D 1% MTL FLM	RN55D40R2F	
R130	0083840	RESISTOR 30.1 OHM RN55D 1% MTL FLM	RN55D30R1F	
R131	0079118	RESISTOR 100 OHM RN55C 1% MTL FLM	RN55C1000F	
R132	0083842	RESISTOR 33.2 OHM RN55D 1% MTL FLM	RN55D33R2F	
R133	0083097	RESISTOR 332 OHM RN55C 1% MTL FLM	RN55C3320F	
R134	0083856	RESISTOR 110 OHM RN55C 1% MTL FLM	RN55C1100F	
R135	0083090	RESISTOR 90.9 OHM RN55C 1% MTL FLM	RN55C90R9F	
R136	0083853	RESISTOR 82.5 OHM RN55C 1% MTL FLM	RN55C82R5F	
R137	0075551	RESISTOR 10 OHM 1/4W 5% COMP	RCR07G100JS	01121
R138	0078929	RESISTOR 1.00K OHM RN55C 1% MTL FLM	RN55C1001F	
R139	0074696	RESISTOR 470 OHM 1/4W 5% COMP	RCR07G471JS	01121
R140	0079118	RESISTOR 100 OHM RN55C 1% MTL FLM	RN55C1000F	
R141	0079116	RESISTOR 40.2 OHM RN55D 1% MTL FLM	RN55D40R2F	
R142	0083840	RESISTOR 30.1 OHM RN55D 1% MTL FLM	RN55D30R1F	
R143	0079118	RESISTOR 100 OHM RN55C 1% MTL FLM	RN55C1000F	
R144	0083849	RESISTOR 49.9 OHM RN55C 1% MTL FLM	RN55C49R9F	
R145	0083090	RESISTOR 90.9 OHM RN55C 1% MTL FLM	RN55C90R9F	
R146	0083853	RESISTOR 82.5 OHM RN55C 1% MTL FLM	RN55C82R5F	
R147	0074702	RESISTOR 1.0K OHM 1/4W 5% COMP	RCR07G102JS	01121
R148	0083849	RESISTOR 49.9 OHM RN55C 1% MTL FLM	RN55C49R9F	
R149	0079118	RESISTOR 100 OHM RN55C 1% MTL FLM	RN55C1000F	
R150	0083830	RESISTOR 18.7 OHM RN55D 1% MTL FLM	RN55D18R7F	
R151	0078929	RESISTOR 1.00K OHM RN55C 1% MTL FLM	RN55C1001F	
R152	0074706	RESISTOR 1.5K OHM 1/4W 5% COMP	RCR07G152JS	01121
R153	0083855	RESISTOR 105 OHM RN55C 1% MTL FLM	RN55C1050F	
R154	0085745	RESISTOR 68.1 OHM RN55C 1% MTL FLM	RN55C68R1F	
R155	0083819	RESISTOR 11.0 OHM RN55D 1% MTL FLM	RN55D11R0F	
R156	0075551	RESISTOR 10 OHM 1/4W 5% COMP	RCR07G100JS	01121
R157	0074710	RESISTOR 2.2K OHM 1/4W 5% COMP	RCR07G222JS	01121
R158	0084265	RESISTOR 100K OHM 1/4W 5% COMP	RCR07G104JS	01121
R159	0074735	RESISTOR 22K OHM 1/4W 5% COMP	RCR07G223JS	01121
R160	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121

R161	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R162	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R163	0075551	RESISTOR 10 OHM 1/4W 5% COMP	RCR07G100JS	01121
R164	0078700	FACTORY SELECTED VALUE	PER DISCP.	
R165	0083891	RESISTOR 1.50K OHM RN55C 1% MTL FLM	RN55C1501F	
R166	0083842	RESISTOR 33.2 OHM RN55D 1% MTL FLM	RN55D33R2F	
R167	0083801	RESISTOR 150 OHM RN55C 1% MTL FLM	RN55C1500F	
R168	0071917	RESISTOR 330 OHM 1/4W 5% COMP	RCR07G331JS	01121
R169	0083089	RESISTOR 75.0 OHM RN55C 1% MTL FLM	RN55C75R0F	
R170	0083842	RESISTOR 33.2 OHM RN55D 1% MTL FLM	RN55D33R2F	
R171	0083801	RESISTOR 150 OHM RN55C 1% MTL FLM	RN55C1500F	
R172	0071917	RESISTOR 330 OHM 1/4W 5% COMP	RCR07G331JS	01121
R173	0079713	RESISTOR 2.00K OHM RN55C 1% MTL FLM	RN55C2001F	
R174	0174949	RESISTOR 10.0K OHM 1/4W 1% MTL FLM	CCF-551002F	
R175	0078600	NOT ASSIGNED	FOR ENG ONLY	
R176	0087838	POT 2K OHM 1/2W CER 3/8 SQ VERT ADJ 25T	3299W-1-202	
R177	0087838	POT 2K OHM 1/2W CER 3/8 SQ VERT ADJ 25T	3299W-1-202	
R178	0083849	RESISTOR 49.9 OHM RN55C 1% MTL FLM	RN55C49R9F	
R179	0074735	RESISTOR 22K OHM 1/4W 5% COMP	RCR07G223JS	01121
R180	0083849	RESISTOR 49.9 OHM RN55C 1% MTL FLM	RN55C49R9F	
R181	0083842	RESISTOR 33.2 OHM RN55D 1% MTL FLM	RN55D33R2F	
R182	0083842	RESISTOR 33.2 OHM RN55D 1% MTL FLM	RN55D33R2F	
R183	0074679	RESISTOR 150 OHM 1/4W 5% COMP	RCR07G151JS	01121

ANALOG SUBASSEMBLY (A1/A2/A1) - 327989 (cont.)

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
S1	0173960	SWITCH SPST 8 POS DIP RT ANG W/ SEAL	206-8RAST	
T1	0177027	XFMR 1;1.37CT PRI L 680UH	2745C	
T2	0177027	XFMR 1;1.37CT PRI L 680UH	2745C	
U1	0177033	IC CLOCK GEN FOR 80C86/80C88	IP82C84A-5	
U2	0177032	IC MICROPRCSR 8-BIT CMOS 8 MHZ	IP80C88A-2	
U3	0089428	RESISTOR NETWORK 9 10K OHM 2% 10 SIP	4310R-101-103	
U4	0177002	IC CMOS BUFFER 10-BIT NONINVRT	AM29C827PC	
U5	0173225	IC CMOS FLIP-FLOP TYPE-D	CD74HC574E	
U6	0086514	IC OP AMP JFET 8L-DIP 70C COMP DUAL	TL082ACP	
U7	0173225	IC CMOS FLIP-FLOP TYPE-D	CD74HC574E	
U8	0174578	IC A/D CONVERTER 8-BIT 3-STATE	AD670JN	
U9	0086514	IC OP AMP JFET 8L-DIP 70C COMP DUAL	TL082ACP	
U10	0088406	IC ECL FLIP-FLOP TYPE-D 160MHZ M/S DUAL	F10131DC	
U11	0086514	IC OP AMP JFET 8L-DIP 70C COMP DUAL	TL082ACP	
U12	0177045	IC COMPACTOR-VOLTAGE 16L-DIP	CMP96870SID	
U13	0089653	IC ECL GATE AND 2-IN QUAD 3AND-1AND/NAND	F10104DC	
U14	0177251	IC CMOS LTCH 10B TRNSPRNT 3-ST	AM29C841PC	
U15	0175953	IC CMOS BUS TRANSCEIVER 8-BIT	SN74HC245N	
U16	0173221	IC CMOS GATE NAND 2-IN QUAD	MM74HC00N	
U17	0174228	IC CMOS MULTIPLEXER 8-BIT/1-CH	MM74HC25IN	
U18	0172466	IC CMOS COUNTER 12-STAGE	MM74HC404ON	
U19	0177961	IC CMOS D/A CONV 12-BIT 8-BIT	AD7548JN	
U20	0177961	IC CMOS D/A CONV 12-BIT 8-BIT	AD7548JN	
U21	0177045	IC COMPACTOR-VOLTAGE 16L-DIP	CMP96870SID	
U22	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U23	0174947	IC MEM CMOS RAM 8192X8 150NS	HM6264LP-15	
U24	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U25	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U26	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U27	0081658	IC TTL BUFFER HEX OPEN-COL	SN7407N	01295
U28	0330211	IC CMOS BUFFER OCTAL	1.00	
U29	0173641	IC FIRST IN/FIRST OUT BUFFER	Z8060PS	
U30	0173225	IC CMOS FLIP-FLOP TYPE-D	CD74HC574E	
U31	0177003	IC CMOS TRANSCVR BUS 10-BIT	AM29C861/BLA	
U32	0177003	IC CMOS TRANSCVR BUS 10-BIT	AM29C861/BLA	
U33	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U34	0177002	IC CMOS BUFFER 10-BIT NONINVRT	AM29C827PC	
U35	0177002	IC CMOS BUFFER 10-BIT NONINVRT	AM29C827PC	
U36	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U37	0173225	IC CMOS FLIP-FLOP TYPE-D	CD74HC574E	

U38	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG
U39	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG
VR1	0172319	IC VOLTAGE REFERENCE 2.5V	AD1403
W1	0309274	DELAY LINE 75 OHM 10 NS	
XU1	0086650	SOCKET 18-PIN DIP PC MT	ICT-183-S-T
XU2	0086653	SOCKET 40-PIN DIP PC MT	ICT-406-S-T
XU4	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D
XU5	0086897	SOCKET 20-PIN DIP PC MT	ICT-203-S-T
XU7	0086897	SOCKET 20-PIN DIP PC MT	ICT-203-S-T
XU8	0086897	SOCKET 20-PIN DIP PC MT	ICT-203-S-T
XU14	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D
XU15	0086897	SOCKET 20-PIN DIP PC MT	ICT-203-S-T
XU19	0086897	SOCKET 20-PIN DIP PC MT	ICT-203-S-T
XU20	0086897	SOCKET 20-PIN DIP PC MT	ICT-203-S-T
XU22	0086652	SOCKET 28-PIN DIP PC MT	ICT-286-S-TG30
XU23	0086652	SOCKET 28-PIN DIP PC MT	ICT-286-S-TG30
XU24	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D
XU25	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D
XU26	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D
XU28	0086897	SOCKET 20-PIN DIP PC MT	ICT-203-S-T
XU29	0086652	SOCKET 28-PIN DIP PC MT	ICT-286-S-TG30

ANALOG SUBASSEMBLY (A1/A2/A1) - 327989 (cont.)

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
XU30	0086897	SOCKET 20-PIN DIP PC MT	ICT-203-S-T	
XU31	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU32	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU33	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU34	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU35	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU36	0177349	SOCKET 32-PIN PCMT 6-LEAD SPACE	ICT-326-S-TG	
XU37	0086897	SOCKET 20-PIN DIP PC MT	ICT-203-S-T	
XU38	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU39	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	

DS1/DS3 TRANSMITTER ASSEMBLY (A1/A3) - 327969

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
1	0327890	SUB-ASSY PWB DS1/DS3 XMTR DTA		
2	0082463	EXTRACTOR PC BOARD	5005-08N	13103
3	0457022	EPROM & LABEL SET XMTR DTA/DAS		
J11	0084940	CONN COAX SMB MALE PC MT 75 OHM	51-151-0000	98291
J12	0084940	CONN COAX SMB MALE PC MT 75 OHM	51-151-0000	98291
J13	0084940	CONN COAX SMB MALE PC MT 75 OHM	51-151-0000	98291
J14	0174930	CONN HEADER SGL ROW STRAIGHT 3-PIN LK	MLSS100-3	
U13	0328017	ASSY PAL PROGRAM U13 XMTR DTA		
U20	0328019	ASSY PAL PROGRAM U20 XMTR DTA		
U22	0328021	ASSY PAL PROGRAM U22 XMTR DTA		

DS1/DS3 TRANSMITTER SUBASSEMBLY (A1/A3/A1) - 327890

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
2	0317056	DUAL IN-LINE PAD	814-045	
BB1	0177102	BUS DSTRBTN 2-LYR VERT MT DIP	QV-2 17.6.3 (.1)	
BB2	0177102	BUS DSTRBTN 2-LYR VERT MT DIP	QV-2 17.6.3 (.1)	
C1	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C2	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C3	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C4	0083649	CAPACITR 7-25 PF MIN CER DISC PC MT	538-011-B-7-25	72982
C5	0081936	CAPACITR 20 PF 100V CER DISC COG 5%	835-COG0-200J	72982
C6	0070501	CAPACITR 47 PF 1 KV CER DISC S2L 10%	DD-470	71590
C7	0081936	CAPACITR 20 PF 100V CER DISC COG 5%	835-COG0-200J	72982
C8	0081251	CAPACITR 56 PF 1 KV CER DISC S3N 10%	DD560	71590
C9	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C10	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C11	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C12	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C13	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C14	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982

C15	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C16	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C17	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C18	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C19	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C20	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C21	0083649	CAPACITR 7-25 PF MIN CER DISC PC MT	538-011-B-7-25	72982
C22	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C23	0078600	NOT ASSIGNED	FOR ENG ONLY	
C24	0078600	NOT ASSIGNED	FOR ENG ONLY	
C25	0078600	NOT ASSIGNED	FOR ENG ONLY	
C26	0078600	NOT ASSIGNED	FOR ENG ONLY	
C27	0081101	CAPACITR 1 MF 50V CER MONO 20%	8131-050-651-105M	72982
C28	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C29	0035656	CAPACITR 100 MF 20V SOLID TANT POL 10%	T362D107K020AS	05397
C30	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C31	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C32	0035656	CAPACITR 100 MF 20V SOLID TANT POL 10%	T362D107K020AS	05397
C33	0070474	CAPACITR 10 PF 1 KV CER DISC S2L 10%	DD-100	71590
C34	0070474	CAPACITR 10 PF 1 KV CER DISC S2L 10%	DD-100	71590
C35	0070490	CAPACITR 30 PF 500V SILVER MICA 5%	CD15ED300J03	14655
C36	0077659	CAPACITR 62 PF 500V SILVER MICA 5%	CD6ED620J03	14655

DS1/DS3 TRANSMITTER SUBASSEMBLY (A1/A3/A1) - 327890 (cont.)

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
DS1	0177211	LAMP LED-RSTR RED PC MT 5V 3MA	555-2007	
DS2	0177211	LAMP LED-RSTR RED PC MT 5V 3MA	555-2007	
DS3	0177211	LAMP LED-RSTR RED PC MT 5V 3MA	555-2007	
DS4	0177211	LAMP LED-RSTR RED PC MT 5V 3MA	555-2007	
E1	0177971	CHOKE WIDE-BAND 3B .236X394L	VK20009-3B	
E2	0177971	CHOKE WIDE-BAND 3B .236X394L	VK20009-3B	
E3	0177971	CHOKE WIDE-BAND 3B .236X394L	VK20009-3B	
J1	0173712	CONN RECT 96-COND MALE PNL MT RT ANG PC	10-8457-096-002-097	
J2	0173712	CONN RECT 96-COND MALE PNL MT RT ANG PC	10-8457-096-002-097	
J3	0078600	NOT ASSIGNED	FOR ENG ONLY	
J4	0078600	NOT ASSIGNED	FOR ENG ONLY	
J5	0078600	NOT ASSIGNED	FOR ENG ONLY	
J6	0078600	NOT ASSIGNED	FOR ENG ONLY	
J7	0078600	NOT ASSIGNED	FOR ENG ONLY	
J8	0078600	NOT ASSIGNED	FOR ENG ONLY	
J9	0078600	NOT ASSIGNED	FOR ENG ONLY	
J10	0078600	NOT ASSIGNED	FOR ENG ONLY	
J11	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
J12	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
J13	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
J14	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
J15	0078600	NOT ASSIGNED	FOR ENG ONLY	
J16	0078600	NOT ASSIGNED	FOR ENG ONLY	
J17	0174000	NOT USED ON THIS ASSEMBLY		
J18	0078600	NOT ASSIGNED	FOR ENG ONLY	
L1	0080804	INDUCTOR 1.0 UH MIN SHLD MOLDED 10%	155-1ROK	09021
L2	0080805	INDUCTOR 2.2 UH MIN SHLD 10%	15S-2R2K	09021
L3	0077971	INDUCTOR 1.5 UH SUBMIN UNSHLD 10%	IR-2	91637
L4	0080805	INDUCTOR 2.2 UH MIN SHLD 10%	15S-2R2K	09021
L5	0176207	INDUCTOR 120UH Q-62 SHLD 5% .164DIA	WEE-120	
L6	0176207	INDUCTOR 120UH Q-62 SHLD 5% .164DIA	WEE-120	
L7	0176225	INDUCTOR 100UH Q-63 SHLD 5% .164D	WEE-100	
L8	0080805	INDUCTOR 2.2 UH MIN SHLD 10%	15S-2R2K	09021
Q1	0174224	TRANSSTR MRF 571 NPN SIL	MRF571	
Q2	0077148	TRANSSTR 2N3251 PNP SIL	2N3251	04713
Q3	0075091	TRANSSTR 2N2857 NPN SIL	2N2857	04713
Q4	0075091	TRANSSTR 2N2857 NPN SIL	2N2857	04713
Q5	0075091	TRANSSTR 2N2857 NPN SIL	2N2857	04713

Q6	0174224	TRANSSTR MRF 571 NPN SIL	MRF571	
Q7	0174224	TRANSSTR MRF 571 NPN SIL	MRF571	
Q8	0077148	TRANSSTR 2N3251 PNP SIL	2N3251	04713
Q9	0174224	TRANSSTR MRF 571 NPN SIL	MRF571	
Q10	0174224	TRANSSTR MRF 571 NPN SIL	MRF571	
Q11	0174224	TRANSSTR MRF 571 NPN SIL	MRF571	
Q12	0077148	TRANSSTR 2N3251 PNP SIL	2N3251	04713
Q13	0077147	TRANSSTR 2N3947 NPN SIL	2N3947	04713
Q14	0077147	TRANSSTR 2N3947 NPN SIL	2N3947	04713
Q15	0083032	TRANSSTR 2N2222A NPN SIL	2N2222A	
Q16	0083032	TRANSSTR 2N2222A NPN SIL	2N2222A	
R1	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R2	0074710	RESISTOR 2.2K OHM 1/4W 5% COMP	RCR07G222JS	01121
R3	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R4	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R5	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R6	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R7	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R8	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R9	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R10	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R11	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R12	0079126	RESISTOR 604 OHM RN55C 1% MTL FLM	RN55C6040F	

DS1/DS3 TRANSMITTER SUBASSEMBLY (A1/A3/A1) - 327890 (cont.)

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
R13	0079863	RESISTOR 1.21K OHM RN55C 1% MTL FLM	RN55C1211F	
R14	0079863	RESISTOR 1.21K OHM RN55C 1% MTL FLM	RN55C1211F	
R15	0074710	RESISTOR 2.2K OHM 1/4W 5% COMP	RCR07G222JS	01121
R16	0075551	RESISTOR 10 OHM 1/4W 5% COMP	RCR07G100JS	01121
R17	0083089	RESISTOR 75.0 OHM RN55C 1% MTL FLM	RN55C75R0F	
R18	0083089	RESISTOR 75.0 OHM RN55C 1% MTL FLM	RN55C75R0F	
R19	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R20	0074706	RESISTOR 1.5K OHM 1/4W 5% COMP	RCR07G152JS	01121
R21	0074679	RESISTOR 150 OHM 1/4W 5% COMP	RCR07G151JS	01121
R22	0075551	RESISTOR 10 OHM 1/4W 5% COMP	RCR07G100JS	01121
R23	0074706	RESISTOR 1.5K OHM 1/4W 5% COMP	RCR07G152JS	01121
R24	0174217	RESISTOR 137 OHM RN55C 1% MTL	RN55C1370F	
R25	0074706	RESISTOR 1.5K OHM 1/4W 5% COMP	RCR07G152JS	01121
R26	0083860	RESISTOR 154 OHM RN55C 1% MTL FLM	RN55C1540F	
R27	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R28	0074718	RESISTOR 3.9K OHM 1/4W 5% COMP	RCR07G392JS	01121
R29	0083089	RESISTOR 75.0 OHM RN55C 1% MTL FLM	RN55C75R0F	
R30	0074718	RESISTOR 3.9K OHM 1/4W 5% COMP	RCR07G392JS	01121
R31	0083840	RESISTOR 30.1 OHM RN55D 1% MTL FLM	RN55D30R1F	
R32	0074718	RESISTOR 3.9K OHM 1/4W 5% COMP	RCR07G392JS	01121
R33	0083851	RESISTOR 59.0 OHM RN55C 1% MTL FLM	RN55C59R0F	
R34	0074696	RESISTOR 470 OHM 1/4W 5% COMP	RCR07G471JS	01121
R35	0074718	RESISTOR 3.9K OHM 1/4W 5% COMP	RCR07G392JS	01121
R36	0083089	RESISTOR 75.0 OHM RN55C 1% MTL FLM	RN55C75R0F	
R37	0083827	RESISTOR 16.2 OHM RN55D 1% MTL FLM	RN55D16R2F	
R38	0085745	RESISTOR 68.1 OHM RN55C 1% MTL FLM	RN55C68R1F	
R39	0083863	RESISTOR 187 OHM RN55C 1% MTL FLM	RN55C1870F	
R40	0077524	RESISTOR 75 OHM 1/4W 5% COMP	RCR07G750JS	01121
R41	0075551	RESISTOR 10 OHM 1/4W 5% COMP	RCR07G100JS	01121
R42	0083819	RESISTOR 11.0 OHM RN55D 1% MTL FLM	RN55D11R0F	
R43	0083800	RESISTOR 115 OHM RN55C 1% MTL FLM	RN55C1150F	
R44	0083838	RESISTOR 27.4 OHM RN55D 1% MTL FLM	RN55D27R4F	
R45	0083800	RESISTOR 115 OHM RN55C 1% MTL FLM	RN55C1150F	
R46	0083838	RESISTOR 27.4 OHM RN55D 1% MTL FLM	RN55D27R4F	
R47	0083089	RESISTOR 75.0 OHM RN55C 1% MTL FLM	RN55C75R0F	
R48	0083800	RESISTOR 115 OHM RN55C 1% MTL FLM	RN55C1150F	
R49	0083838	RESISTOR 27.4 OHM RN55D 1% MTL FLM	RN55D27R4F	
R50	0075551	RESISTOR 10 OHM 1/4W 5% COMP	RCR07G100JS	01121
R51	0085745	RESISTOR 68.1 OHM RN55C 1% MTL FLM	RN55C68R1F	
R52	0083819	RESISTOR 11.0 OHM RN55D 1% MTL FLM	RN55D11R0F	
R53	0075551	RESISTOR 10 OHM 1/4W 5% COMP	RCR07G100JS	01121
R54	0085745	RESISTOR 68.1 OHM RN55C 1% MTL FLM	RN55C68R1F	

R55	0083819	RESISTOR 11.0 OHM RN55D 1% MTL FLM	RN55D11R0F	
R56	0075551	RESISTOR 10 OHM 1/4W 5% COMP	RCR07G100JS	01121
R57	0085745	RESISTOR 68.1 OHM RN55C 1% MTL FLM	RN55C68R1F	
R58	0083819	RESISTOR 11.0 OHM RN55D 1% MTL FLM	RN55D11R0F	
R59	0074706	RESISTOR 1.5K OHM 1/4W 5% COMP	RCR07G152JS	01121
R60	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R61	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R62	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R63	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R64	0074710	RESISTOR 2.2K OHM 1/4W 5% COMP	RCR07G222JS	01121
R65	0078929	RESISTOR 1.00K OHM RN55C 1% MTL FLM	RN55C1001F	
R66	0175693	RESISTOR 1.13K OHM RN55C 1%	RN55C1131F	
R67	0078929	RESISTOR 1.00K OHM RN55C 1% MTL FLM	RN55C1001F	
R68	0175693	RESISTOR 1.13K OHM RN55C 1%	RN55C1131F	
R69	0079114	RESISTOR 10.0 OHM RN55D 1% MTL FLM	RN55D10R0F	
R70	0079126	RESISTOR 604 OHM RN55C 1% MTL FLM	RN55C6040F	
R71	0079126	RESISTOR 604 OHM RN55C 1% MTL FLM	RN55C6040F	
R72	0080379	RESISTOR 1.37K OHM RN55C 1% MTL FLM	RN55C1371F	
R73	0079114	RESISTOR 10.0 OHM RN55D 1% MTL FLM	RN55D10R0F	
R74	0079126	RESISTOR 604 OHM RN55C 1% MTL FLM	RN55C6040F	
R75	0079126	RESISTOR 604 OHM RN55C 1% MTL FLM	RN55C6040F	
R76	0080379	RESISTOR 1.37K OHM RN55C 1% MTL FLM	RN55C1371F	
R77	0083881	RESISTOR 866 OHM RN55C 1% MTL FLM	RN55C8660F	
R78	0083800	RESISTOR 115 OHM RN55C 1% MTL FLM	RN55C1150F	

DS1/DS3 TRANSMITTER SUBASSEMBLY (A1/A3/A1) - 327890 (cont.)

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
R79	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R80	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R81	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R82	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R83	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R84	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R85	0074727	RESISTOR 10K OHM 1/4W 5% COMP	RCR07G103JS	01121
R86	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R87	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R88	0074675	RESISTOR 100 OHM 1/4W 5% COMP	RCR07G101JS	01121
R89	0075597	RESISTOR 82 OHM 1/4W 5% COMP	RCR07G820JS	01121
R90	0077592	RESISTOR 120 OHM 1/4W 5% COMP	RCR07G121JS	01121
R91	0075597	RESISTOR 82 OHM 1/4W 5% COMP	RCR07G820JS	01121
R92	0077592	RESISTOR 120 OHM 1/4W 5% COMP	RCR07G121JS	01121
R93	0083089	RESISTOR 75.0 OHM RN55C 1% MTL FLM	RN55C75R0F	
R94	0083089	RESISTOR 75.0 OHM RN55C 1% MTL FLM	RN55C75R0F	
R95	0078110	RESISTOR 180 OHM 1/4W 5% COMP	RCR07G181JS	01121
R96	0075692	RESISTOR 82K OHM 1/4W 5% COMP	RCR07G823JS	01121
R97	0087841	POT 20K OHM 1/2W CER 3/8 SQ VERT ADJ 25T	3299W-1-203	
R98	0074727	RESISTOR 10K OHM 1/4W 5% COMP	RCR07G103JS	01121
R99	0071856	RESISTOR 33 OHM 1/4W 5% COMP	RCR07G330JS	01121
R100	0071856	RESISTOR 33 OHM 1/4W 5% COMP	RCR07G330JS	01121
R101	0071856	RESISTOR 33 OHM 1/4W 5% COMP	RCR07G330JS	01121
R102	0071856	RESISTOR 33 OHM 1/4W 5% COMP	RCR07G330JS	01121
R103	0071856	RESISTOR 33 OHM 1/4W 5% COMP	RCR07G330JS	01121
R104	0071856	RESISTOR 33 OHM 1/4W 5% COMP	RCR07G330JS	01121
T1	0177027	XFMR 1;1.37CT PRI L 680UH	2745C	
TP1	0082909	TERMINAL PRESS MT DISCONNECT .058-PIN	60599-1	00779
TP2	0082909	TERMINAL PRESS MT DISCONNECT .058-PIN	60599-1	00779
TP3	0082909	TERMINAL PRESS MT DISCONNECT .058-PIN	60599-1	00779
U1	0327878	IC PATTERN GENERATOR		
U2	0327877	IC FRAMER		
U3	0327876	IC CLOCK REC DIGITAL		
U4	0304112	OSCILLATOR CLOCK 44736 MHZ MDL 4633	PER SA DWG	
U5	0089252	RESISTOR NETWORK 9 4.7K OHM 2% 10 SIP	4310R-101-472	
U6	0327878	IC PATTERN GENERATOR		
U7	0327877	IC FRAMER		
U8	0327876	IC CLOCK REC DIGITAL		
U9	0172455	IC CMOS GATE AND 2-IN QUAD	MM74HC08N	

U10	0172465	IC CMOS COUNTER 4-BIT BINARY	MM74HC393N	
U11	0252731	OSCILLATOR, CLOCK 6.176 MHZ MDL 4653	03 02003 001 6.176	
U12	0174227	IC CMOS LATCH 8-BIT ADDRESSABL	MM744C259N	
U13	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U14	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U15	0081658	IC TTL BUFFER HEX OPEN-COL	SN7407N	01295
U16	0174111	IC CMOS LATCH 8-BIT 3-STATE	MM74HC373N	
U17	0177003	IC CMOS TRANSCVR BUS 10-BIT	AM29C861/BLA	
U18	0177003	IC CMOS TRANSCVR BUS 10-BIT	AM29C861/BLA	
U19	0177002	IC CMOS BUFFER 10-BIT NONINVRT	AM29C827PC	
U20	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U21	0177002	IC CMOS BUFFER 10-BIT NONINVRT	AM29C827PC	
U22	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U23	0088405	IC ECL TRANSLATOR ECL/TTL QUAD	F10125DC	
XU1	0177011	SOCKET 68 POS PLCC PC MT	PLCC-68-P-T	
XU2	0177011	SOCKET 68 POS PLCC PC MT	PLCC-68-P-T	
XU3	0177011	SOCKET 68 POS PLCC PC MT	PLCC-68-P-T	
XU6	0177011	SOCKET 68 POS PLCC PC MT	PLCC-68-P-T	
XU7	0177011	SOCKET 68 POS PLCC PC MT	PLCC-68-P-T	
XU8	0177011	SOCKET 68 POS PLCC PC MT	PLCC-68-P-T	
XU13	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU14	0177349	SOCKET 32-PIN PCMT 6-LEAD SPACE	ICT-326-S-TG	
XU16	0086897	SOCKET 20-PIN DIP PC MT	ICT-203-S-T	

DS1/DS3 TRANSMITTER SUBASSEMBLY (A1/A3/A1) - 327890 (cont.)

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
XU17	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU18	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU19	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU20	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU21	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU22	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
Z1	0327940	HYBRID 75 OHM DSX - 3	PER SA DWEG 327940	
Z2	0327942	HYBRID 75 OHM TRIPPLE BUF	PER SA DWG 327942	
Z3	0327944	HYBRID 100 OHM DS1 OUTPUT	PER SA DWG 327944	

TRANSMITTER CARD ASSEMBLY (A1/A3) - 309123

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
1	0309237	SUB-ASSY PWB XMTR MDL AT 9500		
2	0082463	EXTRACTOR PC BOARD	5005-08N	13103
3	0457016	EPROM & LABEL SET XMTR DTA/DAS		
J11	0084940	CONN COAX SMB MALE PC MT 75 OHM	51-151-0000	98291
J12	0084940	CONN COAX SMB MALE PC MT 75 OHM	51-151-0000	98291
J13	0084940	CONN COAX SMB MALE PC MT 75 OHM	51-151-0000	98291
J14	0174930	CONN HEADER SGL ROW STRAIGHT 3-PIN LK	MLSS100-3	
U18	0309148	ASSY PAL PRGM U18 XMTR DTA/DAS		
U25	0309149	ASSY PAL PRGM U25 XMTR DTA/DAS		
U27	0309625	ASSY PAL PRGM U27 XMTR DTA/DAS		

TRANSMITTER SUBASSEMBLY (A1/A3/A1) - 309237

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
2	0317056	DUAL IN-LINE PAD	814-045	
BB1	0177102	BUS DSTRBTN 2-LYR VERT MT DIP	QV-2 17.6.3 (.1)	
BB2	0177237	BUS DSTRBTN 3-LYR VERT MT DIP	QV-3 4.10.1.2 (.2)	
C1	0083649	CAPACITR 7-25 PF MIN CER DISC PC MT	538-011-B-7-25	72982
C2	0083649	CAPACITR 7-25 PF MIN CER DISC PC MT	538-011-B-7-25	72982
C3	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C4	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C5	0083258	CAPACITR CHIP .1 MF 50V	C1813C104M5XAH	
C6	0081210	CAPACITR .01 MF 50V CER MONO X7R 10%	RPE121X7R103K50V	72982
C7	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C8	0081210	CAPACITR .01 MF 50V CER MONO X7R 10%	RPE121X7R103K50V	72982
C9	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C10	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C11	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C12	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C13	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C14	0081210	CAPACITR .01 MF 50V CER MONO X7R 10%	RPE121X7R103K50V	72982

C15	0081210	CAPACITR .01 MF 50V CER MONO X7R 10%	RPE121X7R103K50V	72982
C16	0081210	CAPACITR .01 MF 50V CER MONO X7R 10%	RPE121X7R103K50V	72982
C17	0081210	CAPACITR .01 MF 50V CER MONO X7R 10%	RPE121X7R103K50V	72982
C18	0081210	CAPACITR .01 MF 50V CER MONO X7R 10%	RPE121X7R103K50V	72982
C19	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C20	0174000	NOT USED ON THIS ASSEMBLY		
C21	0083258	CAPACITR CHIP .1 MF 50V	C1813C104M5XAH	
C22	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C23	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C24	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C25	0078600	NOT ASSIGNED	FOR ENG ONLY	
C26	0078600	NOT ASSIGNED	FOR ENG ONLY	
C27	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C28	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C29	0035656	CAPACITR 100 MF 20V SOLID TANT POL 10%	T362D107K020AS	05397
C30	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C31	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C32	0035656	CAPACITR 100 MF 20V SOLID TANT POL 10%	T362D107K020AS	05397
C33	0035656	CAPACITR 100 MF 20V SOLID TANT POL 10%	T362D107K020AS	05397
C34	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C35	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C36	0078600	NOT ASSIGNED	FOR ENG ONLY	
C37	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C38	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982

TRANSMITTER SUBASSEMBLY (A1/A3/A1) - 309237 (cont.)

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
C39	0174000	NOT USED ON THIS ASSEMBLY		
C40	0094272	CAPACITR CHIP .001 MF 100V	PER DWG 94272	
C41	0094272	CAPACITR CHIP .001 MF 100V	PER DWG 94272	
C42	0094272	CAPACITR CHIP .001 MF 100V	PER DWG 94272	
DS1	0177211	LAMP LED-RSTR RED PC MT 5V 3MA	555-2007	
DS2	0177211	LAMP LED-RSTR RED PC MT 5V 3MA	555-2007	
DS3	0177211	LAMP LED-RSTR RED PC MT 5V 3MA	555-2007	
DS4	0177211	LAMP LED-RSTR RED PC MT 5V 3MA	555-2007	
E1	0177971	CHOKE WIDE-BAND 3B .236X394L	VK20009-3B	
E2	0177971	CHOKE WIDE-BAND 3B .236X394L	VK20009-3B	
E3	0177971	CHOKE WIDE-BAND 3B .236X394L	VK20009-3B	
E13	0177971	CHOKE WIDE-BAND 3B .236X394L	VK20009-3B	
J1	0173712	CONN RECT 96-COND MALE PNL MT RT ANG PC	10-8457-096-002-097	
J2	0173712	CONN RECT 96-COND MALE PNL MT RT ANG PC	10-8457-096-002-097	
J3	0174000	NOT USED ON THIS ASSEMBLY		
J4	0174000	NOT USED ON THIS ASSEMBLY		
J5	0174000	NOT USED ON THIS ASSEMBLY		
J6	0174000	NOT USED ON THIS ASSEMBLY		
J7	0174000	NOT USED ON THIS ASSEMBLY		
J8	0174000	NOT USED ON THIS ASSEMBLY		
J9	0174000	NOT USED ON THIS ASSEMBLY		
J10	0174000	NOT USED ON THIS ASSEMBLY		
J11	0174000	NOT USED ON THIS ASSEMBLY		
J12	0174000	NOT USED ON THIS ASSEMBLY		
J13	0174000	NOT USED ON THIS ASSEMBLY		
J14	0174000	NOT USED ON THIS ASSEMBLY		
J15	0174000	NOT USED ON THIS ASSEMBLY		
J16	0174000	NOT USED ON THIS ASSEMBLY		
J17	0174000	NOT USED ON THIS ASSEMBLY		
J18	0174000	NOT USED ON THIS ASSEMBLY		
J19	0174000	NOT USED ON THIS ASSEMBLY		
J20	0174000	NOT USED ON THIS ASSEMBLY		
J21	0174000	NOT USED ON THIS ASSEMBLY		
J22	0178481	CONN HEADER DBL ROW RT ANG 1-PIN PC	TSW-101-09-G-D-RA	
J23	0178481	CONN HEADER DBL ROW RT ANG 1-PIN PC	TSW-101-09-G-D-RA	
L1	0079558	INDUCTOR .33 UH SUBMIN SHLD ENCAP 10%	E-.33	72259

Q1	0077148	TRANSSTR 2N3251 PNP SIL	2N3251	04713
R1	0078600	NOT ASSIGNED	FOR ENG ONLY	
R2	0087839	POT 5K OHM 1/2 CER 3/8 SQ VERT ADJ 25T	3299W-1-502	
R3	0087839	POT 5K OHM 1/2 CER 3/8 SQ VERT ADJ 25T	3299W-1-502	
R4	0078600	NOT ASSIGNED	FOR ENG ONLY	
R5	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R6	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R7	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R8	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R9	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R10	0071917	RESISTOR 330 OHM 1/4W 5% COMP	RCR07G331JS	01121
R11	0074733	RESISTOR 18K OHM 1/4W 5% COMP	RCR07G183JS	01121
R12	0078600	NOT ASSIGNED	FOR ENG ONLY	
R13	0078600	NOT ASSIGNED	FOR ENG ONLY	
R14	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R15	0074710	RESISTOR 2.2K OHM 1/4W 5% COMP	RCR07G222JS	01121
R16	0071917	RESISTOR 330 OHM 1/4W 5% COMP	RCR07G331JS	01121
R17	0074714	RESISTOR 3.3K OHM 1/4W 5% COMP	RCR07G332JS	01121
R18	0074733	RESISTOR 18K OHM 1/4W 5% COMP	RCR07G183JS	01121
R19	0078600	NOT ASSIGNED	FOR ENG ONLY	
R20	0174000	NOT USED ON THIS ASSEMBLY		
R21	0083089	RESISTOR 75.0 OHM RN55C 1% MTL FLM	RN55C75R0F	
R22	0083877	RESISTOR 536 OHM RN55C 1% MTL FLM	RN55C5360F	

TRANSMITTER SUBASSEMBLY (A1/A3/A1) - 309237 (cont.)

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
R23	0083877	RESISTOR 536 OHM RN55C 1% MTL FLM	RN55C5360F	
R24	0077592	RESISTOR 120 OHM 1/4W 5% COMP	RCR07G121JS	01121
R25	0075597	RESISTOR 82 OHM 1/4W 5% COMP	RCR07G820JS	01121
R26	0074714	RESISTOR 3.3K OHM 1/4W 5% COMP	RCR07G332JS	01121
R27	0074733	RESISTOR 18K OHM 1/4W 5% COMP	RCR07G183JS	01121
R28	0174000	NOT USED ON THIS ASSEMBLY		
R29	0078600	NOT ASSIGNED	FOR ENG ONLY	
R30	0074702	RESISTOR 1.0K OHM 1/4W 5% COMP	RCR07G102JS	01121
R31	0071917	RESISTOR 330 OHM 1/4W 5% COMP	RCR07G331JS	01121
R32	0083853	RESISTOR 82.5 OHM RN55C 1% MTL FLM	RN55C82R5F	
R33	0078927	RESISTOR 1.65K OHM RN55C 1% MTL FLM	RN55C1651F	
R34	0078927	RESISTOR 1.65K OHM RN55C 1% MTL FLM	RN55C1651F	
R35	0074710	RESISTOR 2.2K OHM 1/4W 5% COMP	RCR07G222JS	01121
R36	0079123	RESISTOR 301 OHM RN55C 1% MTL FLM	RN55C3010F	
R37	0079123	RESISTOR 301 OHM RN55C 1% MTL FLM	RN55C3010F	
R38	0074698	RESISTOR 560 OHM 1/4W 5% COMP	RCR07G561JS	01121
R39	0083899	RESISTOR 2.26K OHM RN55C 1% MTL FLM	RN55C2261F	
R40	0080380	RESISTOR 2.74K OHM RN55C 1% MTL FLM	RN55C2741F	
R41	0075551	RESISTOR 10 OHM 1/4W 5% COMP	RCR07G100JS	01121
R42	0078600	NOT ASSIGNED	FOR ENG ONLY	
R43	0077592	RESISTOR 120 OHM 1/4W 5% COMP	RCR07G121JS	01121
R44	0075597	RESISTOR 82 OHM 1/4W 5% COMP	RCR07G820JS	01121
R45	0074718	RESISTOR 3.9K OHM 1/4W 5% COMP	RCR07G392JS	01121
R46	0174000	NOT USED ON THIS ASSEMBLY		
R47	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R48	0074727	RESISTOR 10K OHM 1/4W 5% COMP	RCR07G103JS	01121
R49	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R50	0078600	NOT ASSIGNED	FOR ENG ONLY	
R51	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R52	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R53	0078600	NOT ASSIGNED	FOR ENG ONLY	
R54	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R55	0075551	RESISTOR 10 OHM 1/4W 5% COMP	RCR07G100JS	01121
R56	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R57	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R58	0078600	NOT ASSIGNED	FOR ENG ONLY	
R59	0074706	RESISTOR 1.5K OHM 1/4W 5% COMP	RCR07G152JS	01121
R60	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
T1	0177027	XFMR 1;1.37CT PRI L 680UH	2745C	
TP1	0082909	TERMINAL PRESS MT DISCONNECT .058-PIN	60599-1	00779

U1	0304112	OSCILLATOR CLOCK 44736 MHZ MDL 4633	PER SA DWG	
U2	0177395	IC CMOS MUX DUAL 4LINE TO 1 3S	74AC11253N	
U3	0173221	IC CMOS GATE NAND 2-IN QUAD	MM74HC00N	
U4	0327878	IC PATTERN GENERATOR		
U5	0327877	IC FRAMER		
U6	0327876	IC CLOCK REC DIGITAL		
U7	0174506	RESISTOR NETWORK 4 100 OHM 2%	4308R-102-101	
U8	0252731	OSCILLATOR,CLOCK 6.176MHZ MDL 4653	03 02003 001 6.176	
U9	0172465	IC CMOS COUNTER 4-BIT BINARY	MM74HC393N	
U10	0174228	IC CMOS MULTIPLEXER 8-BIT/1-CH	MM74HC251N	
U11	0173221	IC CMOS GATE NAND 2-IN QUAD	MM74HC00N	
U12	0327878	IC PATTERN GENERATOR		
U13	0327877	IC FRAMER		
U14	0327876	IC CLOCK REC DIGITAL		
U15	0172455	IC CMOS GATE AND 2-IN QUAD	MM74HC08N	
U16	0089239	IC ECL LINE RECEIVER TRIPLE	MOS MC10116L	
U17	0174227	IC CMOS LATCH 8-BIT ADDRESSABL	MM744C259N	
U18	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U19	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U20	0081658	IC TTL BUFFER HEX OPEN-COL	SN7407N	01295
U21	0174111	IC CMOS LATCH 8-BIT 3-STATE	MM74HC373N	
U22	0177003	IC CMOS TRANSCVR BUS 10-BIT	AM29C861/BLA	
U23	0177003	IC CMOS TRANSCVR BUS 10-BIT	AM29C861/BLA	

TRANSMITTER SUBASSEMBLY (A1/A3/A1) - 309237 (cont.)

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
U24	0177002	IC CMOS BUFFER 10-BIT NONINVRT	AM29C827PC	
U25	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U26	0177002	IC CMOS BUFFER 10-BIT NONINVRT	AM29C827PC	
U27	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U28	0174000	NOT USED ON THIS ASSEMBLY		
U29	0177499	IC CMOS GATE NAND 2-IN QUAD	74AC11000N	
XU4	0177011	SOCKET 68 POS PLCC PC MT	PLCC-68-P-T	
XU5	0177011	SOCKET 68 POS PLCC PC MT	PLCC-68-P-T	
XU6	0177011	SOCKET 68 POS PLCC PC MT	PLCC-68-P-T	
XU12	0177011	SOCKET 68 POS PLCC PC MT	PLCC-68-P-T	
XU13	0177011	SOCKET 68 POS PLCC PC MT	PLCC-68-P-T	
XU14	0177011	SOCKET 68 POS PLCC PC MT	PLCC-68-P-T	
XU18	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU19	0177349	SOCKET 32-PIN PCMT 6-LEAD SPACE	ICT-326-S-TG	
XU21	0086897	SOCKET 20-PIN DIP PC MT	ICT-203-S-T	
XU22	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU23	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU24	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU25	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU26	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU27	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
Z1	0327940	HYBRID 75 OHM DSX - 3	PER SA DWEG 327940	
Z2	0327942	HYBRID 75 OHM TRIPPLE BUF	PER SA DWG 327942	
Z3	0327944	HYBRID 100 OHM DS1 OUTPUT	PER SA DWG 327944	

RTC ASSEMBLY (A1/A4) - 327968

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
1	0327887	SUB-ASSY PWB RTC DTA		
U1	0176856	IC MEM CMOSRAM32768X8 120NS ST	CXK58256P12	
U2	0176856	IC MEM CMOSRAM32768X8 120NS ST	CXK58256P12	
U36	0328041	ASSY PAL PROGRAM U36 RTC DTA		
U37	0457021	ASSY PAL PROGRAM U37 RTC		
U39	0309118	ASSY PAL PROGRAM U39 RTC		
U40	0309669	ASSY PAL PROGRAM U40 RTC		
U46	0309115	ASSY PAL PROGRAM U46 RTC		
U47	0457046	ASSY PAL PROGRAM U47 RTC		

RTC SUBASSEMBLY (A1/A4/A1) - 458359

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
1	0458354	PWB RTC DTA		
BT1	0306233	BATTERY NI-CAD 3.6V 100MA HRS		
C1	0083649	CAPACITR 7-25 PF MIN CER DISC PC MT	538-011-B-7-25	72982
C2	0070470	CAPACITR 10 PF 500V SILVER MICA 5%	CD15CD100J03	14655
C3	0035654	CAPACITR 10 MF 25V SOLID TANT POL 10%	T362B106K025AS	05397
C4	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C5	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C6	0035654	CAPACITR 10 MF 25V SOLID TANT POL 10%	T362B106K025AS	05397
C7	0035654	CAPACITR 10 MF 25V SOLID TANT POL 10%	T362B106K025AS	05397
C8	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C9	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C10	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C11	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C12	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C13	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C14	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C15	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C16	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C17	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982

C18	0078600	NOT ASSIGNED	FOR ENG ONLY	
C19	0078600	NOT ASSIGNED	FOR ENG ONLY	
C20	0078600	NOT ASSIGNED	FOR ENG ONLY	
C21	0078600	NOT ASSIGNED	FOR ENG ONLY	
C22	0078600	NOT ASSIGNED	FOR ENG ONLY	
C23	0078600	NOT ASSIGNED	FOR ENG ONLY	
C24	0078600	NOT ASSIGNED	FOR ENG ONLY	
C25	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C26	0078600	NOT ASSIGNED	FOR ENG ONLY	
C27	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C28	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C29	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C30	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C31	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C32	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C33	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C34	0070540	CAPACITR 470 PF 1KV CER DISC Z5F 10%	DD-471	71590
C35	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C36	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C37	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C38	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C39	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C40	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C41	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982

RTC SUBASSEMBLY (A1/A4/A1) - 458359 (cont.)

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
C42	0035654	CAPACITR 10 MF 25V SOLID TANT POL 10%	T362B106K025AS	05397
C43	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C44	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C45	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
DS1	0177211	LAMP LED-RSTR RED PC MT 5V 3MA	555-2007	
DS2	0177211	LAMP LED-RSTR RED PC MT 5V 3MA	555-2007	
DS3	0177211	LAMP LED-RSTR RED PC MT 5V 3MA	555-2007	
DS4	0177211	LAMP LED-RSTR RED PC MT 5V 3MA	555-2007	
DS5	0177211	LAMP LED-RSTR RED PC MT 5V 3MA	555-2007	
DS6	0177211	LAMP LED-RSTR RED PC MT 5V 3MA	555-2007	
DS7	0177211	LAMP LED-RSTR RED PC MT 5V 3MA	555-2007	
E1	0177971	CHOKE WIDE-BAND 3B .236X394L	VK20009-3B	
E2	0177971	CHOKE WIDE-BAND 3B .236X394L	VK20009-3B	
E3	0177971	CHOKE WIDE-BAND 3B .236X394L	VK20009-3B	
J1	0173712	CONN RECT 96-COND MALE PNL MT RT ANGL PC	10-8457-096-002-097	
J2	0173712	CONN RECT 96-COND MALE PNL MT RT ANGL PC	10-8457-096-002-097	
J3	0176974	CONN RECT R ANG PC 48COND MALE	10-8457-048-002-025	
J4	0172726	CONN HEADER SGL ROW RT ANGLE	640099-2	
J5	0078600	NOT ASSIGNED	FOR ENG ONLY	
J6	0087229	CONN HEADER SGL ROW STRAIGHT 2-PIN PC	87220-2	
J7	0078600	NOT ASSIGNED	FOR ENG ONLY	
J8	0078600	NOT ASSIGNED	FOR ENG ONLY	
J9	0078600	NOT ASSIGNED	FOR ENG ONLY	
J10	0078600	NOT ASSIGNED	FOR ENG ONLY	
J11	0078600	NOT ASSIGNED	FOR ENG ONLY	
J12	0174000	NOT USED ON THIS ASSEMBLY		
J13	0177177	TERMNL QUICK DISC 20-16FEM.187	42638-2	
P4	0086884	JUMPER FEMALE INSULATED .10 SPACING	65474-004	
P6	0086884	JUMPER FEMALE INSULATED .10 SPACING	65474-004	
Q1	0077147	TRANSSTR 2N3947 NPN SIL	2N3947	04713
Q2	0077148	TRANSSTR 2N3251 PNP SIL	2N3251	04713
Q3	0083033	TRANSSTR 2N2907A PNP SIL	2N2907A	
Q4	0077147	TRANSSTR 2N3947 NPN SIL	2N3947	04713
Q5	0177028	TRANSSTR 2N7000 FET N-CHNL	2N7000	
R1	0178252	RESISTOR 3.32K OHM 1/4W 1% MF	5043ED3K320F	
R2	0178258	RESISTOR 4.75K OHM 1/4W 1% MF	5043ED4K750F	
R3	0178252	RESISTOR 3.32K OHM 1/4W 1% MF	5043ED3K320F	

R4	0078600	NOT ASSIGNED	FOR ENG ONLY	
R5	0078600	NOT ASSIGNED	FOR ENG ONLY	
R6	0178258	RESISTOR 4.75K OHM 1/4W 1% MF	5043ED4K750F	
R7	0178271	RESISTOR 100K OHM 1/4W 1% MF	5043ED100K0F	
R8	0081341	RESISTOR 22 MEG 1/4W 10% COMP	RCR07G226KS	01121
R9	0178237	RESISTOR 750 OHM 1/4W 1% MF	5043ED750R0F	
R10	0178258	RESISTOR 4.75K OHM 1/4W 1% MF	5043ED4K750F	
R11	0174949	RES 10.0K OHM 1/4W 1% MTL FLM	CCF-551002F	
R12	0178215	RESISTOR 100 OHM 1/4W 1% MF	5043ED100R0F	
R13	0178271	RESISTOR 100K OHM 1/4W 1% MF	5043ED100K0F	
R14	0178249	RESISTOR 2.21K OHM 1/4W 1% MF	5043ED2K210F	
R15	0083931	RESISTOR 33.2K OHM RN55C 1% MTL FLM	RN55C3322F	
R16	0178258	RESISTOR 4.75K OHM 1/4W 1% MF	5043ED4K750F	
R17	0178258	RESISTOR 4.75K OHM 1/4W 1% MF	5043ED4K750F	
R18	0178258	RESISTOR 4.75K OHM 1/4W 1% MF	5043ED4K750F	
R19	0174949	RES 10.0K OHM 1/4W 1% MTL FLM	CCF-551002F	
R20	0178241	RESISTOR 1.00K OHM 1/4W 1% MF	5043ED1K000F	
R21	0178258	RESISTOR 4.75K OHM 1/4W 1% MF	5043ED4K750F	
R22	0178247	RESISTOR 1.50K OHM 1/4W 1% MF	5043ED1K500F	
R23	0078600	NOT ASSIGNED	FOR ENG ONLY	
R24	0178241	RESISTOR 1.00K OHM 1/4W 1% MF	5043ED1K000F	
R25	0078600	NOT ASSIGNED	FOR ENG ONLY	
R26	0078600	NOT ASSIGNED	FOR ENG ONLY	
R27	0178258	RESISTOR 4.75K OHM 1/4W 1% MF	5043ED4K750F	

RTC SUBASSEMBLY (A1/A4/A1) - 458359 (cont.)

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
R28	0178258	RESISTOR 4.75K OHM 1/4W 1% MF	5043ED4K750F	
R29	0178258	RESISTOR 4.75K OHM 1/4W 1% MF	5043ED4K750F	
R30	0078600	NOT ASSIGNED	FOR ENG ONLY	
R31	0178258	RESISTOR 4.75K OHM 1/4W 1% MF	5043ED4K750F	
R32	0178258	RESISTOR 4.75K OHM 1/4W 1% MF	5043ED4K750F	
R33	0178241	RESISTOR 1.00K OHM 1/4W 1% MF	5043ED1K000F	
R34	0178251	RESISTOR 3.01K OHM 1/4W 1% MF	5043ED3K010F	
R35	0178248	RESISTOR 2.00K OHM 1/4W 1% MF	5043ED2K000F	
R36	0178271	RESISTOR 100K OHM 1/4W 1% MF	5043ED100K0F	
R37	0178256	RESISTOR 4.02K OHM 1/4W 1% MF	5043ED4K020F	
R38	0078600	NOT ASSIGNED	FOR ENG ONLY	
R39	0078600	NOT ASSIGNED	FOR ENG ONLY	
R40	0078600	NOT ASSIGNED	FOR ENG ONLY	
R41	0078600	NOT ASSIGNED	FOR ENG ONLY	
R42	0078600	NOT ASSIGNED	FOR ENG ONLY	
R43	0178308	RESISTOR 22.1K OHM 1/4W1% MF	5043ED22K10F	
R44	0178230	RESISTOR 332 OHM 1/4W 1% MF	5043ED332R0F	
R45	0178230	RESISTOR 332 OHM 1/4W 1% MF	5043ED332R0F	
S1	0083296	SWITCH SPST 8 POS PC MT DIP	435166-5	00779
SP1	0176977	ALRM.1-324KHZ 105DB30V PP MAX	PKD33EP-01R	
U1	0084000	VARIES WITH MODEL,SEE HIGHER ASSY FOR PN	PER S A DWG	
U2	0084000	VARIES WITH MODEL,SEE HIGHER ASSY FOR PN	PER S A DWG	
U3	0084000	VARIES WITH MODEL,SEE HIGHER ASSY FOR PN	PER S A DWG	
U4	0084000	VARIES WITH MODEL,SEE HIGHER ASSY FOR PN	PER S A DWG	
U5	0084000	VARIES WITH MODEL,SEE HIGHER ASSY FOR PN	PER S A DWG	
U6	0084000	VARIES WITH MODEL,SEE HIGHER ASSY FOR PN	PER S A DWG	
U7	0084000	VARIES WITH MODEL,SEE HIGHER ASSY FOR PN	PER S A DWG	
U8	0084000	VARIES WITH MODEL,SEE HIGHER ASSY FOR PN	PER S A DWG	
U9	0173221	IC CMOS GATE NAND 2-IN QUAD	MM74HC00N	
U10	0173221	IC CMOS GATE NAND 2-IN QUAD	MM74HC00N	
U11	0176988	IC SCC CMOS 6MHZ HQL-DIP	Z8530APC	
U12	0177170	OSCLTR 7.98MHZ CRSTL.005%.5X.8	45-7.9872 MHZ	
U13	0173223	IC CMOS INVERTER HEX	MM74HC04N	
U14	0174000	NOT USED ON THIS ASSEMBLY		
U15	0174000	NOT USED ON THIS ASSEMBLY		
U16	0174000	NOT USED ON THIS ASSEMBLY		
U17	0174000	NOT USED ON THIS ASSEMBLY		
U18	0174000	NOT USED ON THIS ASSEMBLY		
U19	0174000	NOT USED ON THIS ASSEMBLY		

U20	0174000	NOT USED ON THIS ASSEMBLY		
U21	0174227	IC CMOS LATCH 8-BIT ADDRESSABL	MM744C259N	
U22	0172458	IC CMOS FLIP-FLOP TYPE-D DUAL	MM74HC74N	
U23	0172455	IC CMOS GATE AND 2-IN QUAD	MM74HC08N	
U24	0078600	NOT ASSIGNED	FOR ENG ONLY	
U26	0176985	IC CMOS INVERTER HEX OPN DRAIN	SN74HC05N	
U27	0170303	IC CLOCK CALENDAR FOR MICROS CMOS	MM58167N	
U28	0176987	IC CONT FOR MICROPROCESSOR PWR	MAX691CPE	
U29	0076778	IC TTL COUNTER DECADE 20-MHZ 2X5	N8280A	18324
U30	0173644	IC BUSS TRANSCVR IEEE 488 INTERFACE	TMS9914ANL	
U31	0330211	IC CMOS BUFFER OCTAL		
U32	0330211	IC CMOS BUFFER OCTAL		
U33	0177251	IC CMOS LTCH 10B TRNSPRNT 3-ST	AM29C841PC	
U34	0177002	IC CMOS BUFFER 10-BIT NONINVRT	AM29C827PC	
U35	0174388	IC CMOS COMPARATOR MAGNITUDE	MM74HC85N	
U36	0084000	VARIES WITH MODEL,SEE HIGHER ASSY FOR PN	PER S A DWG	
U37	0084000	VARIES WITH MODEL,SEE HIGHER ASSY FOR PN	PER S A DWG	
U38	0177003	IC CMOS TRANSCVR BUS 10-BIT	AM29C861/BLA	
U39	0084000	VARIES WITH MODEL,SEE HIGHER ASSY FOR PN	PER S A DWG	
U40	0084000	VARIES WITH MODEL,SEE HIGHER ASSY FOR PN	PER S A DWG	
U41	0177002	IC CMOS BUFFER 10-BIT NONINVRT	AM29C827PC	
U42	0177002	IC CMOS BUFFER 10-BIT NONINVRT	AM29C827PC	
U43	0177002	IC CMOS BUFFER 10-BIT NONINVRT	AM29C827PC	
U44	0177003	IC CMOS TRANSCVR BUS 10-BIT	AM29C861/BLA	

RTC SUBASSEMBLY (A1/A4/A1) - 458359 (cont.)

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
U45	0177003	IC CMOS TRANSCVR BUS 10-BIT	AM29C861/BLA	
U46	0084000	VARIES WITH MODEL,SEE HIGHER ASSY FOR PN	PER S A DWG	
U47	0084000	VARIES WITH MODEL,SEE HIGHER ASSY FOR PN	PER S A DWG	
U48	0174227	IC CMOS LATCH 8-BIT ADDRESSABL	MM744C259N	
U49	0081658	IC TTL BUFFER HEX OPEN-COL	SN7407N	01295
U50	0172458	IC CMOS FLIP-FLOP TYPE-D DUAL	MM74HC74N	
U51	0089838	RESISTOR NETWORK 9 100K OHM 2% 10 SIP	431OR 101 104	
U52	0089838	RESISTOR NETWORK 9 100K OHM 2% 10 SIP	431OR 101 104	
U53	0089838	RESISTOR NETWORK 9 100K OHM 2% 10 SIP	431OR 101 104	
U54	0089838	RESISTOR NETWORK 9 100K OHM 2% 10 SIP	431OR 101 104	
U55	0086899	RESISTOR NETWORK 9 3.3K OHM 2% 10 SIP	R3.3K	
U56	0089838	RESISTOR NETWORK 9 100K OHM 2% 10 SIP	431OR 101 104	
U57	0078600	NOT ASSIGNED	FOR ENG ONLY	
U58	0172458	IC CMOS FLIP-FLOP TYPE-D DUAL	MM74HC74N	
U59	0078600	NOT ASSIGNED	FOR ENG ONLY	
U60	0078600	NOT ASSIGNED	FOR ENG ONLY	
U61	0078600	NOT ASSIGNED	FOR ENG ONLY	
XU1	0086652	SOCKET 28 PIN DIP PC MT	ICT-286-S-TG30	
XU2	0086652	SOCKET 28 PIN DIP PC MT	ICT-286-S-TG30	
XU3	0086652	SOCKET 28 PIN DIP PC MT	ICT-286-S-TG30	
XU4	0086652	SOCKET 28 PIN DIP PC MT	ICT-286-S-TG30	
XU5	0086652	SOCKET 28 PIN DIP PC MT	ICT-286-S-TG30	
XU6	0086652	SOCKET 28 PIN DIP PC MT	ICT-286-S-TG30	
XU7	0086652	SOCKET 28 PIN DIP PC MT	ICT-286-S-TG30	
XU8	0086652	SOCKET 28 PIN DIP PC MT	ICT-286-S-TG30	
XU11	0086653	SOCKET 40 PIN DIP PC MT	ICT-406-S-T	
XU14	0078600	NOT ASSIGNED	FOR ENG ONLY	
XU15	0078600	NOT ASSIGNED	FOR ENG ONLY	
XU16	0078600	NOT ASSIGNED	FOR ENG ONLY	
XU17	0078600	NOT ASSIGNED	FOR ENG ONLY	
XU18	0078600	NOT ASSIGNED	FOR ENG ONLY	
XU19	0078600	NOT ASSIGNED	FOR ENG ONLY	
XU20	0078600	NOT ASSIGNED	FOR ENG ONLY	
XU27	0086651	SOCKET 24 PIN DIP PC MT	ICT-246-S-T	
XU30	0086653	SOCKET 40 PIN DIP PC MT	ICT-406-S-T	
XU31	0086897	SOCKET 20 PIN DIP PC MT	ICT-203-S-T	
XU32	0086897	SOCKET 20 PIN DIP PC MT	ICT-203-S-T	
XU33	0173737	SOCKET 24 PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU34	0173737	SOCKET 24 PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU36	0173737	SOCKET 24 PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU37	0173737	SOCKET 24 PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	

XU38	0173737	SOCKET 24 PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D
XU39	0173737	SOCKET 24 PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D
XU40	0173737	SOCKET 24 PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D
XU41	0173737	SOCKET 24 PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D
XU42	0173737	SOCKET 24 PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D
XU43	0173737	SOCKET 24 PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D
XU44	0173737	SOCKET 24 PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D
XU45	0173737	SOCKET 24 PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D
XU46	0086897	SOCKET 20 PIN DIP PC MT	ICT-203-S-T
XU47	0173737	SOCKET 24 PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D
Y1	0170302	CRYSTAL 32.768 KHZ .003% PARALLEL RES	32.768KHZ CAL A

CPU ASSEMBLY (A1/A5) - 307219

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
1	0307218	SUB-ASSY PWB CPU DTA		
2	0457018	EPROM & LABEL SET CPU DTA/DAS		
U44	0307236	ASSY PAL PROGRAM U44 CPU DTA		
U53	0307242	ASSY PAL PROGRAM U53 CPU DTA		
U54	0307263	ASSY PAL PROGRAM U54 CPU DTA		
U55	0307240	ASSY PAL PROGRAM U55 CPU DTA		
U56	0307244	ASSY PAL PROGRAM U56 CPU DTA		

CPU SUBASSEMBLY (A1/A5/A1) - 307218

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
BB1	0177102	BUS DSTRBTN 2-LYR VERT MT DIP	QV-2 17.6.3 (.1)	
C1	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C2	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C3	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C4	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C5	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C6	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C7	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C8	0081926	CAPACITR 10 PF 500V CER DISC COH +-.25P	831-COHO-100C	72982
C9	0081792	CAPACITR 30 PF 100V CER DISC U1G 5%	805-024-U1G0-300J	72982
C10	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C11	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C12	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C13	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C14	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C15	0086133	CAPACITR .047 MF 50V CER MONO X7R 10%	C320C473K5R5EA	
C16	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C17	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C18	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C19	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C20	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C21	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982

C22	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C23	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C24	0035656	CAPACITR 100 MF 20V SOLID TANT POL 10%	T362D107K020AS	05397
C25	0035656	CAPACITR 100 MF 20V SOLID TANT POL 10%	T362D107K020AS	05397
C26	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
CR1	0071122	DIODE 1N914 SIL 75V 75MA	1N914	80368
CR2	0071122	DIODE 1N914 SIL 75V 75MA	1N914	80368
DS1	0177211	LAMP LED-RSTR RED PC MT 5V 3MA	555-2007	
DS2	0177211	LAMP LED-RSTR RED PC MT 5V 3MA	555-2007	
DS3	0177211	LAMP LED-RSTR RED PC MT 5V 3MA	555-2007	
DS4	0177211	LAMP LED-RSTR RED PC MT 5V 3MA	555-2007	
DS5	0177211	LAMP LED-RSTR RED PC MT 5V 3MA	555-2007	
DS6	0177211	LAMP LED-RSTR RED PC MT 5V 3MA	555-2007	
DS7	0177211	LAMP LED-RSTR RED PC MT 5V 3MA	555-2007	
DS8	0177211	LAMP LED-RSTR RED PC MT 5V 3MA	555-2007	
E1	0177971	CHOKE WIDE-BAND 3B .236X394L	VK20009-3B	
E2	0177971	CHOKE WIDE-BAND 3B .236X394L	VK20009-3B	
J1	0173712	CONN RECT 96-COND MALE PNL MT RT ANG PC	10-8457-096-002-097	
J2	0173712	CONN RECT 96-COND MALE PNL MT RT ANG PC	10-8457-096-002-097	
J3	0078600	NOT ASSIGNED	FOR ENG ONLY	

CPU SUBASSEMBLY (A1/A5/A1) - 307218 (cont.)

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
J4	0078600	NOT ASSIGNED	FOR ENG ONLY	
J5	0078600	NOT ASSIGNED	FOR ENG ONLY	
J6	0078600	NOT ASSIGNED	FOR ENG ONLY	
J7	0087366	CONN HEADER SGL ROW STRAIGHT 3-PIN PC	87220-3	
J8	0087366	CONN HEADER SGL ROW STRAIGHT 3-PIN PC	87220-3	
J9	0087229	CONN HEADER SGL ROW STRAIGHT 2-PIN PC	87220-2	
J10	0078600	NOT ASSIGNED	FOR ENG ONLY	
J11	0087366	CONN HEADER SGL ROW STRAIGHT 3-PIN PC	87220-3	
P8	0086884	JUMPER FEMALE INSULATED .10 SPACING	65474-004	
P9	0086884	JUMPER FEMALE INSULATED .10 SPACING	65474-004	
P11	0086884	JUMPER FEMALE INSULATED .10 SPACING	65474-004	
R1	0072026	RESISTOR 10K OHM 1/4W 10% COMP	RCR07G103KS	01121
R2	0072026	RESISTOR 10K OHM 1/4W 10% COMP	RCR07G103KS	01121
R3	0071856	RESISTOR 33 OHM 1/4W 5% COMP	RCR07G330JS	01121
R4	0072026	RESISTOR 10K OHM 1/4W 10% COMP	RCR07G103KS	01121
R5	0074702	RESISTOR 1.0K OHM 1/4W 5% COMP	RCR07G102JS	01121
R6	0072026	RESISTOR 10K OHM 1/4W 10% COMP	RCR07G103KS	01121
R7	0071856	RESISTOR 33 OHM 1/4W 5% COMP	RCR07G330JS	01121
R8	0071856	RESISTOR 33 OHM 1/4W 5% COMP	RCR07G330JS	01121
R9	0071856	RESISTOR 33 OHM 1/4W 5% COMP	RCR07G330JS	01121
R10	0072026	RESISTOR 10K OHM 1/4W 10% COMP	RCR07G103KS	01121
R11	0072026	RESISTOR 10K OHM 1/4W 10% COMP	RCR07G103KS	01121
S1	0173960	SWITCH SPST 8 POS DIP RT ANG W/ SEAL	206-8RAST	
U1	0173221	IC CMOS GATE NAND 2-IN QUAD	MM74HC00N	
U2	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U3	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U4	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U5	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U6	0089428	RESISTOR NETWORK 9 1OK OHM 2% 10 SIP	4310R-101-103	
U7	0089428	RESISTOR NETWORK 9 1OK OHM 2% 10 SIP	4310R-101-103	
U8	0177005	IC MICROPRCSR 16-BIT NMOS 10MHZ	N80L286-10	
U9	0087091	RESISTOR NETWORK 9 1K OHM 2% 10 SIP	431OR-101-102	
U10	0177008	IC PC/AT COMPATIBLE MEMRY CONT	VL82C102-QC	
U11	0089428	RESISTOR NETWORK 9 1OK OHM 2% 10 SIP	4310R-101-103	
U12	0177007	IC PC/AT COMPATIBLE SYSTM CONT	L82C101-QC	
U13	0089428	RESISTOR NETWORK 9 1OK OHM 2% 10 SIP	4310R-101-103	
U14	0171880	IC TTL GATE INVERTER HEX	F74F04PC	
U15	0171598	IC TTL GATE NAND 3-IN TRIPLE	74F10PC	

U16	0176979	IC DLY LINE HYB/TTL 50NS TAP	MDLDM-TTL-50
U17	0176273	IC TTL GATE AND 3-IN TRIPLE	74F11PC
U18	0089838	RESISTOR NETWORK 9 100K OHM 2% 10 SIP	431OR 101 104
U19	0170207	IC TTL GATE OR 2-IN QUAD	74F32PC
U20	0330211	IC CMOS BUFFER OCTAL	
U21	0174242	IC CMOS FLIP-FLOP TYPE-D OCTAL	MM74HC273N
U22	0089428	RESISTOR NETWORK 9 1OK OHM 2% 10 SIP	4310R-101-103
U23	0177009	IC PC/AT COMPATIBLE ADDRS BUFR	VL82C103-QC
U24	0177006	IC PC/AT COMPATIBLE PRPHL CONT	L82C100-QC
U25	0177010	IC PC/AT COMPATIBLE DATA BUFFR	VL82C104-QC
U26	0088089	RESISTOR NETWORK 9 2.2K OHM 2% 10 SIP	DALE MSPIOH-01-222G
U27	0088089	RESISTOR NETWORK 9 2.2K OHM 2% 10 SIP	DALE MSPIOH-01-222G
U28	0174892	RES NTWK 8 33 OHM 2% 16 DIP	MDP1603-330G
U29	0176983	IC MEM CMOS RAM 256KX4 12ONS D	TMS44C256-12N
U30	0176983	IC MEM CMOS RAM 256KX4 12ONS D	TMS44C256-12N
U31	0176983	IC MEM CMOS RAM 256KX4 12ONS D	TMS44C256-12N
U32	0176983	IC MEM CMOS RAM 256KX4 12ONS D	TMS44C256-12N
U33	0176984	IC MEM NMOS RAM 256KX1 12ONS D	TMS4256-12NL
U34	0176984	IC MEM NMOS RAM 256KX1 12ONS D	TMS4256-12NL
U35	0177243	IC CMOS BUFFER OCTL N-INV 3-ST	CD74AC244E
U36	0089428	RESISTOR NETWORK 9 1OK OHM 2% 10 SIP	4310R-101-103
U37	0177244	IC CMOS BFR/LINE DR 10-B INVRT	AM29C828PC
U38	0177003	IC CMOS TRANSCVR BUS 10-BIT	AM29C861/BLA
U39	0177003	IC CMOS TRANSCVR BUS 10-BIT	AM29C861/BLA

CPU SUBASSEMBLY (A1/A5/A1) - 307218 (cont.)

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
U40	0177002	IC CMOS BUFFER 10-BIT NONINVRT	AM29C827PC	
U41	0177002	IC CMOS BUFFER 10-BIT NONINVRT	AM29C827PC	
U42	0177002	IC CMOS BUFFER 10-BIT NONINVRT	AM29C827PC	
U43	0174111	IC CMOS LATCH 8-BIT 3-STATE	MM74HC373N	
U44	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U45	0089428	RESISTOR NETWORK 9 1OK OHM 2% 10 SIP	4310R-101-103	
U46	0177244	IC CMOS BFR/LINE DR 10-B INVRT	AM29C828PC	
U47	0177003	IC CMOS TRANSCVR BUS 10-BIT	AM29C861/BLA	
U48	0177003	IC CMOS TRANSCVR BUS 10-BIT	AM29C861/BLA	
U49	0177002	IC CMOS BUFFER 10-BIT NONINVRT	AM29C827PC	
U50	0177002	IC CMOS BUFFER 10-BIT NONINVRT	AM29C827PC	
U51	0177243	IC CMOS BUFFER OCTL N-INV 3-ST	CD74AC244E	
U52	0089428	RESISTOR NETWORK 9 1OK OHM 2% 10 SIP	4310R-101-103	
U53	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U54	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U55	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U56	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U57	0089428	RESISTOR NETWORK 9 1OK OHM 2% 10 SIP	4310R-101-103	
U58	0177243	IC CMOS BUFFER OCTL N-INV 3-ST	CD74AC244E	
XU2	0086652	SOCKET 28-PIN DIP PC MT	ICT-286-S-TG30	
XU3	0086652	SOCKET 28-PIN DIP PC MT	ICT-286-S-TG30	
XU4	0086652	SOCKET 28-PIN DIP PC MT	ICT-286-S-TG30	
XU5	0086652	SOCKET 28-PIN DIP PC MT	ICT-286-S-TG30	
XU8	0177011	SOCKET 68 POS PLCC PC MT	PLCC-68-P-T	
XU10	0177012	SOCKET 84 POS PLCC PC MT	PLCC-84-P-T	
XU12	0177012	SOCKET 84 POS PLCC PC MT	PLCC-84-P-T	
XU20	0086897	SOCKET 20-PIN DIP PC MT	ICT-203-S-T	
XU21	0086897	SOCKET 20-PIN DIP PC MT	ICT-203-S-T	
XU23	0177012	SOCKET 84 POS PLCC PC MT	PLCC-84-P-T	
XU24	0177012	SOCKET 84 POS PLCC PC MT	PLCC-84-P-T	
XU25	0177012	SOCKET 84 POS PLCC PC MT	PLCC-84-P-T	
XU29	0086897	SOCKET 20-PIN DIP PC MT	ICT-203-S-T	
XU30	0086897	SOCKET 20-PIN DIP PC MT	ICT-203-S-T	
XU31	0086897	SOCKET 20-PIN DIP PC MT	ICT-203-S-T	
XU32	0086897	SOCKET 20-PIN DIP PC MT	ICT-203-S-T	
XU35	0086897	SOCKET 20-PIN DIP PC MT	ICT-203-S-T	
XU37	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU38	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU39	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU40	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU41	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	

XU42	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D
XU43	0086897	SOCKET 20-PIN DIP PC MT	ICT-203-S-T
XU44	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D
XU46	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D
XU47	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D
XU48	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D
XU49	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D
XU50	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D
XU51	0086897	SOCKET 20-PIN DIP PC MT	ICT-203-S-T
XU53	0086897	SOCKET 20-PIN DIP PC MT	ICT-203-S-T
XU54	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D
XU55	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D
XU56	0086897	SOCKET 20-PIN DIP PC MT	ICT-203-S-T
XU58	0086897	SOCKET 20-PIN DIP PC MT	ICT-203-S-T
Y1	0176976	CRYSTAL 20MHZ.015% SE RES HC18	MP200

MOTHERCARD ASSEMBLY (A1/A6) - 327922

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
BB1	0177237	BUS DSTRBTN 3-LYR VERT MT DIP	QV-3 4.10.1.2 (.2)	
BB2	0177237	BUS DSTRBTN 3-LYR VERT MT DIP	QV-3 4.10.1.2 (.2)	
BB3	0177237	BUS DSTRBTN 3-LYR VERT MT DIP	QV-3 4.10.1.2 (.2)	
BB4	0177237	BUS DSTRBTN 3-LYR VERT MT DIP	QV-3 4.10.1.2 (.2)	
C1	0035654	CAPACITR 10 MF 25V SOLID TANT POL 10%	T362B106K025AS	05397
C2	0035654	CAPACITR 10 MF 25V SOLID TANT POL 10%	T362B106K025AS	05397
C3	0035654	CAPACITR 10 MF 25V SOLID TANT POL 10%	T362B106K025AS	05397
C4	0035654	CAPACITR 10 MF 25V SOLID TANT POL 10%	T362B106K025AS	05397
C5	0035654	CAPACITR 10 MF 25V SOLID TANT POL 10%	T362B106K025AS	05397
C6	0035654	CAPACITR 10 MF 25V SOLID TANT POL 10%	T362B106K025AS	05397
C7	0035654	CAPACITR 10 MF 25V SOLID TANT POL 10%	T362B106K025AS	05397
C8	0035654	CAPACITR 10 MF 25V SOLID TANT POL 10%	T362B106K025AS	05397
C11	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C14	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C15	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C16	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C18	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C22	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C27	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C28	0081101	CAPACITR 1 MF 50V CER MONO 20%	8131-050-651-105M	72982
C30	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C32	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C33	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C37	0174000	NOT USED ON THIS ASSEMBLY		
C38	0081101	CAPACITR 1 MF 50V CER MONO 20%	8131-050-651-105M	72982
C39	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C40	0081109	CAPACITR 47 MF 20V SOLID TANT POL 10%	T362C476K020AS	61637
C41	0086013	CAPACITR 22 MF 25V SOLID TANT POL 10%	T362C226K025AS	
C42	0086013	CAPACITR 22 MF 25V SOLID TANT POL 10%	T362C226K025AS	
C43	0086013	CAPACITR 22 MF 25V SOLID TANT POL 10%	T362C226K025AS	
C44	0086013	CAPACITR 22 MF 25V SOLID TANT POL 10%	T362C226K025AS	
C45	0086013	CAPACITR 22 MF 25V SOLID TANT POL 10%	T362C226K025AS	
C46	0086013	CAPACITR 22 MF 25V SOLID TANT POL 10%	T362C226K025AS	
C47	0086013	CAPACITR 22 MF 25V SOLID TANT POL 10%	T362C226K025AS	
C48	0086013	CAPACITR 22 MF 25V SOLID TANT POL 10%	T362C226K025AS	
C49	0081109	CAPACITR 47 MF 20V SOLID TANT POL 10%	T362C476K020AS	61637
C50	0081109	CAPACITR 47 MF 20V SOLID TANT POL 10%	T362C476K020AS	61637
C51	0081109	CAPACITR 47 MF 20V SOLID TANT POL 10%	T362C476K020AS	61637
C52	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C53	0081101	CAPACITR 1 MF 50V CER MONO 20%	8131-050-651-105M	72982

DS1	0177167	LAMP LED YEL REC.1X.3 2.2V20MA	HLMP-0400	
DS2	0177167	LAMP LED YEL REC.1X.3 2.2V20MA	HLMP-0400	
J1	0087036	CONN HEADER DBL ROW STRAIGHT 34-PIN	87478-5	
J2	0087451	CONN HEADER DBL ROW STRAIGHT 26-PIN PC	87478-4	
J3	0078600	NOT ASSIGNED	FOR ENG ONLY	
J4	0174617	CONN HEADER SGL ROW STRAIGHT 12-PIN PC	MLSS156-12	
J5	0087229	CONN HEADER SGL ROW STRAIGHT 2-PIN PC	87220-2	
J9	0084930	CONN HEADER DBL ROW STRAIGHT 20-PIN PC	1-87227-0	00779
J10	0085126	CONN HEADER DBL ROW STRAIGHT 10-PIN PC	87227-5	00779
J11	0173953	CONN RECT 9-COND MALE RT ANG PC MT	HER HZM9RA29CP	
J12	0173954	CONN RECT 25-COND FEMALE RT ANG PC MT	H2R25RA29C2P	
J13	0087229	CONN HEADER SGL ROW STRAIGHT 2-PIN PC	87220-2	
J14	0087229	CONN HEADER SGL ROW STRAIGHT 2-PIN PC	87220-2	
J15	0173933	CONN 24-PIN DOUBLE READOUT RT ANG	552791-1	
J16	0087229	CONN HEADER SGL ROW STRAIGHT 2-PIN PC	87220-2	
J17	0174000	NOT USED ON THIS ASSEMBLY		
L1	0078716	INDUCTOR 100 UH SUBMIN UNSHLD 10%	IR-2	91637
L3	0078716	INDUCTOR 100 UH SUBMIN UNSHLD 10%	IR-2	91637
P101	0086884	JUMPER FEMALE INSULATED .10 SPACING	65474-004	
P103	0086884	JUMPER FEMALE INSULATED .10 SPACING	65474-004	
P105	0086884	JUMPER FEMALE INSULATED .10 SPACING	65474-004	

MOTHERCARD ASSEMBLY (A1/A6) - 327922 (cont.)

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
P107	0086884	JUMPER FEMALE INSULATED .10 SPACING	65474-004	
P109	0086884	JUMPER FEMALE INSULATED .10 SPACING	65474-004	
Q3	0317164	TEST POINT .100 CENTER	SZI PER DWG 317164	
Q4	0078600	NOT ASSIGNED	FOR ENG ONLY	
R1	0074735	RESISTOR 22K OHM 1/4W 5% COMP	RCR07G223JS	01121
R2	0074735	RESISTOR 22K OHM 1/4W 5% COMP	RCR07G223JS	01121
R3	0074735	RESISTOR 22K OHM 1/4W 5% COMP	RCR07G223JS	01121
R4	0074735	RESISTOR 22K OHM 1/4W 5% COMP	RCR07G223JS	01121
R5	0074735	RESISTOR 22K OHM 1/4W 5% COMP	RCR07G223JS	01121
R6	0074696	RESISTOR 470 OHM 1/4W 5% COMP	RCR07G471JS	01121
R7	0074696	RESISTOR 470 OHM 1/4W 5% COMP	RCR07G471JS	01121
R10	0074710	RESISTOR 2.2K OHM 1/4W 5% COMP	RCR07G222JS	01121
R11	0074710	RESISTOR 2.2K OHM 1/4W 5% COMP	RCR07G222JS	01121
R12	0074710	RESISTOR 2.2K OHM 1/4W 5% COMP	RCR07G222JS	01121
R13	0074710	RESISTOR 2.2K OHM 1/4W 5% COMP	RCR07G222JS	01121
R16	0082444	RESISTOR 6.8 OHM 1/4W 5% COMP	RCR07G6R8JS	01121
R18	0079713	RESISTOR 2.00K OHM RN55C 1% MTL FLM	RN55C2001F	
R20	0079713	RESISTOR 2.00K OHM RN55C 1% MTL FLM	RN55C2001F	
R21	0079713	RESISTOR 2.00K OHM RN55C 1% MTL FLM	RN55C2001F	
R22	0079713	RESISTOR 2.00K OHM RN55C 1% MTL FLM	RN55C2001F	
R23	0083853	RESISTOR 82.5 OHM RN55C 1% MTL FLM	RN55C82R5F	
R24	0078600	NOT ASSIGNED	FOR ENG ONLY	
R25	0078600	NOT ASSIGNED	FOR ENG ONLY	
R26	0078600	NOT ASSIGNED	FOR ENG ONLY	
R38	0074700	RESISTOR 820 OHM 1/4W 5% COMP	RCR07G821JS	01121
R39	0082444	RESISTOR 6.8 OHM 1/4W 5% COMP	RCR07G6R8JS	01121
R40	0078600	NOT ASSIGNED	FOR ENG ONLY	
R41	0078600	NOT ASSIGNED	FOR ENG ONLY	
R43	0174000	NOT USED ON THIS ASSEMBLY		
R44	0078600	NOT ASSIGNED	FOR ENG ONLY	
R45	0074710	RESISTOR 2.2K OHM 1/4W 5% COMP	RCR07G222JS	01121
RT1	0078600	NOT ASSIGNED	FOR ENG ONLY	
S1	0173960	SWITCH SPST 8 POS DIP RT ANG W/ SEAL	206-8RAST	
TP5	0082909	TERMINAL PRESS MT DISCONNECT .058-PIN	60599-1	00779
TP6	0082909	TERMINAL PRESS MT DISCONNECT .058-PIN	60599-1	00779
TP10	0082909	TERMINAL PRESS MT DISCONNECT .058-PIN	60599-1	00779

U1	0177182	RESISTOR NETWORK 5 150 OHM 2% 10 SIP	4310R-102-151
U2	0177182	RESISTOR NETWORK 5 150 OHM 2% 10 SIP	4310R-102-151
U3	0177182	RESISTOR NETWORK 5 150 OHM 2% 10 SIP	4310R-102-151
U4	0177182	RESISTOR NETWORK 5 150 OHM 2% 10 SIP	4310R-102-151
U5	0177182	RESISTOR NETWORK 5 150 OHM 2% 10 SIP	4310R-102-151
U6	0177182	RESISTOR NETWORK 5 150 OHM 2% 10 SIP	4310R-102-151
U7	0177182	RESISTOR NETWORK 5 150 OHM 2% 10 SIP	4310R-102-151
U8	0177182	RESISTOR NETWORK 5 150 OHM 2% 10 SIP	4310R-102-151
U9	0177182	RESISTOR NETWORK 5 150 OHM 2% 10 SIP	4310R-102-151
U10	0177182	RESISTOR NETWORK 5 150 OHM 2% 10 SIP	4310R-102-151
U11	0177182	RESISTOR NETWORK 5 150 OHM 2% 10 SIP	4310R-102-151
U12	0177182	RESISTOR NETWORK 5 150 OHM 2% 10 SIP	4310R-102-151
U13	0177182	RESISTOR NETWORK 5 150 OHM 2% 10 SIP	4310R-102-151
U14	0177182	RESISTOR NETWORK 5 150 OHM 2% 10 SIP	4310R-102-151
U15	0177182	RESISTOR NETWORK 5 150 OHM 2% 10 SIP	4310R-102-151
U16	0087092	RESISTOR NETWORK 9 22K OHM 2% 10 SIP	4310R-101-223
U17	0087092	RESISTOR NETWORK 9 22K OHM 2% 10 SIP	4310R-101-223
U18	0087092	RESISTOR NETWORK 9 22K OHM 2% 10 SIP	4310R-101-223
U19	0087092	RESISTOR NETWORK 9 22K OHM 2% 10 SIP	4310R-101-223
U20	0087092	RESISTOR NETWORK 9 22K OHM 2% 10 SIP	4310R-101-223
U21	0087092	RESISTOR NETWORK 9 22K OHM 2% 10 SIP	4310R-101-223
U22	0087092	RESISTOR NETWORK 9 22K OHM 2% 10 SIP	4310R-101-223
U23	0087092	RESISTOR NETWORK 9 22K OHM 2% 10 SIP	4310R-101-223
U24	0087092	RESISTOR NETWORK 9 22K OHM 2% 10 SIP	4310R-101-223

MOTHERCARD ASSEMBLY (A1/A6) - 327922 (cont.)

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
U25	0177182	RESISTOR NETWORK 5 150 OHM 2% 10 SIP	4310R-102-151	
U26	0177182	RESISTOR NETWORK 5 150 OHM 2% 10 SIP	4310R-102-151	
U27	0177182	RESISTOR NETWORK 5 150 OHM 2% 10 SIP	4310R-102-151	
U28	0177182	RESISTOR NETWORK 5 150 OHM 2% 10 SIP	4310R-102-151	
U29	0177182	RESISTOR NETWORK 5 150 OHM 2% 10 SIP	4310R-102-151	
U30	0177182	RESISTOR NETWORK 5 150 OHM 2% 10 SIP	4310R-102-151	
U31	0177182	RESISTOR NETWORK 5 150 OHM 2% 10 SIP	4310R-102-151	
U32	0177182	RESISTOR NETWORK 5 150 OHM 2% 10 SIP	4310R-102-151	
U33	0177182	RESISTOR NETWORK 5 150 OHM 2% 10 SIP	4310R-102-151	
U34	0177182	RESISTOR NETWORK 5 150 OHM 2% 10 SIP	4310R-102-151	
U35	0177182	RESISTOR NETWORK 5 150 OHM 2% 10 SIP	4310R-102-151	
U36	0177182	RESISTOR NETWORK 5 150 OHM 2% 10 SIP	4310R-102-151	
U37	0177182	RESISTOR NETWORK 5 150 OHM 2% 10 SIP	4310R-102-151	
U38	0177182	RESISTOR NETWORK 5 150 OHM 2% 10 SIP	4310R-102-151	
U39	0177182	RESISTOR NETWORK 5 150 OHM 2% 10 SIP	4310R-102-151	
U40	0087092	RESISTOR NETWORK 9 22K OHM 2% 10 SIP	4310R-101-223	
U41	0087092	RESISTOR NETWORK 9 22K OHM 2% 10 SIP	4310R-101-223	
U42	0087092	RESISTOR NETWORK 9 22K OHM 2% 10 SIP	4310R-101-223	
U43	0087092	RESISTOR NETWORK 9 22K OHM 2% 10 SIP	4310R-101-223	
U44	0087092	RESISTOR NETWORK 9 22K OHM 2% 10 SIP	4310R-101-223	
U45	0087092	RESISTOR NETWORK 9 22K OHM 2% 10 SIP	4310R-101-223	
U46	0087092	RESISTOR NETWORK 9 22K OHM 2% 10 SIP	4310R-101-223	
U47	0087092	RESISTOR NETWORK 9 22K OHM 2% 10 SIP	4310R-101-223	
U48	0087092	RESISTOR NETWORK 9 22K OHM 2% 10 SIP	4310R-101-223	
U49	0093980	IC LINE TRANSCEIVER RS-232	MAX 232CPE	
U50	0093980	IC LINE TRANSCEIVER RS-232	MAX 232CPE	
U52	0093980	IC LINE TRANSCEIVER RS-232	MAX 232CPE	
U53	0086899	RESISTOR NETWORK 9 3.3K OHM 2% 10 SIP	R3.3K	
U54	0173638	IC NUS TRANSCVR IEEE 488 INTERFACE MULTI	SN75162AN	
U55	0173636	IC BUS TRANSCVR IEEE 488 INTERFACE	SN75160AN	
U58	0173221	IC CMOS GATE NAND 2-IN QUAD	MM74HC00N	
U59	0173223	IC CMOS INVERTER HEX	MM74HC04N	
U60	0093980	IC LINE TRANSCEIVER RS-232	MAX 232CPE	
U63	0309651	ASSY PAL U63 MOTHERBOARD DTA		
U64	0174227	IC CMOS LATCH 8-BIT ADDRESSABL	MM744C259N	
U65	0174000	NOT USED ON THIS ASSEMBLY		
U66	0173223	IC CMOS INVERTER HEX	MM74HC04N	
U67	0172458	IC CMOS FLIP-FLOP TYPE-D DUAL	MM74HC74N	
U69	0174000	NOT USED ON THIS ASSEMBLY		
U70	0174000	NOT USED ON THIS ASSEMBLY		
U71	0174000	NOT USED ON THIS ASSEMBLY		
U72	0177272	IC TTL MLTPLXR 4-B/1-CH TO 1DL	SN74HC253N	

U73	0177273	OSCILTR 6.176MHZ TCXO ECL OUT	94-6.176-02-03
U74	0078600	NOT ASSIGNED	FOR ENG ONLY
XA11	0173711	CONN RECT 96-COND FEM PNL MT STRAIGHT PC	00-8257-096-649-123
XA12	0173711	CONN RECT 96-COND FEM PNL MT STRAIGHT PC	00-8257-096-649-123
XA21	0173711	CONN RECT 96-COND FEM PNL MT STRAIGHT PC	00-8257-096-649-123
XA22	0173711	CONN RECT 96-COND FEM PNL MT STRAIGHT PC	00-8257-096-649-123
XA31	0173711	CONN RECT 96-COND FEM PNL MT STRAIGHT PC	00-8257-096-649-123
XA32	0173711	CONN RECT 96-COND FEM PNL MT STRAIGHT PC	00-8257-096-649-123
XA41	0173711	CONN RECT 96-COND FEM PNL MT STRAIGHT PC	00-8257-096-649-123
XA42	0173711	CONN RECT 96-COND FEM PNL MT STRAIGHT PC	00-8257-096-649-123
XA43	0176975	CONN RECT 48-COND FEM STRAIGHT	20-8457-048-002-025
XA51	0173711	CONN RECT 96-COND FEM PNL MT STRAIGHT PC	00-8257-096-649-123
XA52	0173711	CONN RECT 96-COND FEM PNL MT STRAIGHT PC	00-8257-096-649-123
XU49	0086649	SOCKET 16-PIN DIP PC MT	ICT-163-S-T
XU50	0086649	SOCKET 16-PIN DIP PC MT	ICT-163-S-T
XU52	0086649	SOCKET 16-PIN DIP PC MT	ICT-163-S-T
XU54	0089605	SOCKET 22-PIN DIP PC MT	ICT-224-S-T
XU55	0086897	SOCKET 20-PIN DIP PC MT	ICT-203-S-T
XU58	0086648	SOCKET 14-PIN DIP PC MT	ICT-143-S-T
XU59	0086648	SOCKET 14-PIN DIP PC MT	ICT-143-S-T
XU60	0086649	SOCKET 16-PIN DIP PC MT	ICT-163-S-T

MOTHERCARD ASSEMBLY (A1/A6) - 327922 (cont.)

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
XU63	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU64	0086649	SOCKET 16-PIN DIP PC MT	ICT-163-S-T	
XU66	0086648	SOCKET 14-PIN DIP PC MT	ICT-143-S-T	
XU67	0086648	SOCKET 14-PIN DIP PC MT	ICT-143-S-T	
XU69	0078600	NOT ASSIGNED	FOR ENG ONLY	
XU70	0078600	NOT ASSIGNED	FOR ENG ONLY	
XU71	0078600	NOT ASSIGNED	FOR ENG ONLY	
XU72	0086649	SOCKET 16-PIN DIP PC MT	ICT-163-S-T	

FRONT-PANEL ASSEMBLY (A1/A7) - 309103

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
1	0307540	AT 9500 DTA FRONT PANEL	1.00	
8	0177176	KNOB CAP/177175 BLK CURVED ARM	3015123	
A1	0309256	ASSY PWB FRNT PNL LED DTA PORT		
A2	0306244	ASSY PWB FRNT PNL BUS DTA PORT		
A3	0309141	ASSY SPEAKER DTA		
DS1	0327961	ASSY DISPLAY DTA		
P1	0177097	CONN HEADER DBL ROW STRAIGHT 34-PIN PC	924527-28-17-10	
W1	0327964	ASSY CABLE DS0 DTA		
W2	0456958	ASSY AUDIO CABLE DTA		
W3	0327948	ASSY DISPLAY CABLE DTA	PER SA DWG 327948	
W4	0327966	ASSY CABLE FRONT PNL INTFC DTA		
W5	0327982	ASSY CABLE FRONT PNL INTFC		
W6	0456954	CABLE ASSY DS1 DTA		
W7	0456954	CABLE ASSY DS1 DTA		
W8	0456954	CABLE ASSY DS1 DTA		
W9	0456956	CABLE ASSY DS3 DTA 22"		
W10	0456955	CABLE ASSY DS3 DTA 28"		
W11	0456955	CABLE ASSY DS3 DTA 28"		
W12	0456955	CABLE ASSY DS3 DTA 28"		
W13	0456955	CABLE ASSY DS3 DTA 28"		

FRONT-PANEL LED ASSEMBLY (A1/A7/A1) - 309256

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
C1	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C2	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C3	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C4	0035654	CAPACITR 10 MF 25V SOLID TANT POL 10%	T362B106K025AS	05397
C5	0084820	CAPACITR 150 MF 15V SOLID TANT POL AGED	T362D157K015AS W/DOT	05397
C6	0081101	CAPACITR 1 MF 50V CER MONO 20%	8131-050-651-105M	72982
C7	0081101	CAPACITR 1 MF 50V CER MONO 20%	8131-050-651-105M	72982
C8	0084820	CAPACITR 150 MF 15V SOLID TANT POL AGED	T362D157K015AS W/DOT	05397
CR1	0071122	DIODE 1N914 SIL 75V 75MA	1N914	80368
DS1	0177167	LAMP LED YEL REC.1X.3 2.2V20MA	HLMP-0400	
DS2	0177167	LAMP LED YEL REC.1X.3 2.2V20MA	HLMP-0400	
DS3	0177167	LAMP LED YEL REC.1X.3 2.2V20MA	HLMP-0400	
DS4	0177167	LAMP LED YEL REC.1X.3 2.2V20MA	HLMP-0400	
DS5	0177166	LAMP LED RED REC.1X.3 2.2V.2MA	HLMP-0300	
DS6	0177166	LAMP LED RED REC.1X.3 2.2V.2MA	HLMP-0300	
DS7	0177166	LAMP LED RED REC.1X.3 2.2V.2MA	HLMP-0300	
DS8	0177166	LAMP LED RED REC.1X.3 2.2V.2MA	HLMP-0300	
DS9	0177166	LAMP LED RED REC.1X.3 2.2V.2MA	HLMP-0300	
DS10	0177166	LAMP LED RED REC.1X.3 2.2V.2MA	HLMP-0300	
DS11	0177166	LAMP LED RED REC.1X.3 2.2V.2MA	HLMP-0300	
DS12	0177166	LAMP LED RED REC.1X.3 2.2V.2MA	HLMP-0300	
DS13	0177167	LAMP LED YEL REC.1X.3 2.2V20MA	HLMP-0400	
DS14	0177167	LAMP LED YEL REC.1X.3 2.2V20MA	HLMP-0400	
DS15	0177167	LAMP LED YEL REC.1X.3 2.2V20MA	HLMP-0400	
DS16	0177167	LAMP LED YEL REC.1X.3 2.2V20MA	HLMP-0400	
DS17	0177166	LAMP LED RED REC.1X.3 2.2V.2MA	HLMP-0300	
DS18	0177167	LAMP LED YEL REC.1X.3 2.2V20MA	HLMP-0400	
J1	0177099	CONN 34P FEM DBL ROW TOP MT TH	929842-01-17-10	
J2	0176209	CONN HEADER SGL ROW RT ANG 3-PIN LK	MLAS100-3-()A	
J3	0078600	NOT ASSIGNED	FOR ENG ONLY	
R1	0177174	POT 10K OHM.5W COND PLAS PNL/PC	PCWIJ-B24-FAD103	
R2	0178241	RESISTOR 1.00K OHM 1/4W 1% MF	5043ED1K000F	
R3	0178239	RESISTOR 806 OHM 1/4W 1% MF	5043ED806R0F	
R4	0071836	RESISTOR 10 OHM 1/4W 10% COMP	RCR07G100KS	01121
R5	0174949	RESISTOR 10.0K OHM 1/4W 1% MTL FLM	CCF-551002F	
R6	0178208	RESISTOR 68.1 OHM 1/4W 1% MF	5043ED68R10F	
R7	0178208	RESISTOR 68.1 OHM 1/4W 1% MF	5043ED68R10F	
R8	0177173	POT 2.5K OHM.75W COND PLAS PNL	PCWIJ-B24-FAB252	

R9	0071937	RESISTOR 680 OHM 1/4W 5% COMP	RCR07G681JS	01121
R10	0178234	RESISTOR 562 OHM 1/4W 1% MF	5043ED562R0F	
R11	0178234	RESISTOR 562 OHM 1/4W 1% MF	5043ED562R0F	
R12	0178234	RESISTOR 562 OHM 1/4W 1% MF	5043ED562R0F	
R13	0178234	RESISTOR 562 OHM 1/4W 1% MF	5043ED562R0F	
R14	0178234	RESISTOR 562 OHM 1/4W 1% MF	5043ED562R0F	
R15	0178234	RESISTOR 562 OHM 1/4W 1% MF	5043ED562R0F	
R16	0178234	RESISTOR 562 OHM 1/4W 1% MF	5043ED562R0F	
R17	0178234	RESISTOR 562 OHM 1/4W 1% MF	5043ED562R0F	
R18	0178234	RESISTOR 562 OHM 1/4W 1% MF	5043ED562R0F	
R19	0178234	RESISTOR 562 OHM 1/4W 1% MF	5043ED562R0F	
R20	0178234	RESISTOR 562 OHM 1/4W 1% MF	5043ED562R0F	
R21	0074698	RESISTOR 560 OHM 1/4W 5% COMP	RCR07G561JS	01121
S1	0177125	SWITCH PUSHBTN SPDT MOM BLK G R	SEAUOAO103GR	
S2	0172481	SWITCH PUSHBTN SPDT MOM BLK BTN GRN LEDS	SEAU0A0102G	
S3	0172481	SWITCH PUSHBTN SPDT MOM BLK BTN GRN LEDS	SEAU0A0102G	
S4	0172481	SWITCH PUSHBTN SPDT MOM BLK BTN GRN LEDS	SEAU0A0102G	
S5	0172481	SWITCH PUSHBTN SPDT MOM BLK BTN GRN LEDS	SEAU0A0102G	
S6	0172481	SWITCH PUSHBTN SPDT MOM BLK BTN GRN LEDS	SEAU0A0102G	
S7	0174604	SWITCH PUSHBTN SPDT MOM BLK BTN 2 GRN LEDS	SEAUOA0103GG	
S8	0172481	SWITCH PUSHBTN SPDT MOM BLK BTN GRN LEDS	SEAU0A0102G	
S9	0174604	SWITCH PUSHBTN SPDT MOM BLK BTN 2 GRN LEDS	SEAUOA0103GG	
S10	0172481	SWITCH PUSHBTN SPDT MOM BLK BTN GRN LEDS	SEAU0A0102G	

FRONT-PANEL LED ASSEMBLY (A1/A7/A1) - 309256 (cont.)

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
S11	0177126	SWITCH PUSHBTN SPDT MOM BLK SQ	SEAU0A0124	
S12	0327930	SWITCH PUSHBTN KEYCAP-UP	PER SA DWG 327930	
S13	0327931	SWITCH PUSHBTN KEYCAP-DOWN	PER SA DWG 327931	
S14	0327928	SWITCH PUSHBTN KEYCAP-LEFT	PER SA DWG 327928	
S15	0327929	SWITCH PUSHBTN KEYCAP-RIGHT	PER SA DWG 327929	
S16	0177126	SWITCH PUSHBTN SPDT MOM BLK SQ	SEAU0A0124	
S17	0174604	SWITCH PUSHBTN SPDT MOM BLK BTN 2 GRN LEDS		SEAUOA0103GG
S18	0174608	SWITCH PUSHBTN SPDT BLK BTN RED	SEAUOA0102R	
U1	0177106	IC DRIVER QUAD CMOS	DS3669N	
U2	0177110	IC AMPL AUDIO 250MW 8L-DIP	LM386N-1	
U3	0330211	IC CMOS BUFFER OCTAL		
U4	0330211	IC CMOS BUFFER OCTAL		
U5	0330211	IC CMOS BUFFER OCTAL		
U6	0177213	RESISTOR NETWORK 8 68 OHM 2% 16DP	4116R-001-680	
U7	0086515	RESISTOR NETWORK 8 2.2K OHM 2% 16 DIP	4116R-001-222	
U8	0173928	IC TRANSSTR ARRAY 4-PNP 2N2907A FAMILY	TPQ2907A	
U9	0173928	IC TRANSSTR ARRAY 4-PNP 2N2907A FAMILY	TPQ2907A	
U10	0177245	RESISTOR NETWORK 5 390 OHM 2% 10 SIP	4310R-102-391	
U11	0177245	RESISTOR NETWORK 5 390 OHM 2% 10 SIP	4310R-102-391	
U12	0087675	RESISTOR NETWORK 9 390 OHM 2%	4310R-101-391	
XU3	0177981	SOCKET 20-PIN DIP .3W DUAL LEAF	2-641602-4	
XU4	0177981	SOCKET 20-PIN DIP .3W DUAL LEAF	2-641602-4	
XU5	0177981	SOCKET 20-PIN DIP .3W DUAL LEAF	2-641602-4	

FRONT-PANEL BUS ASSEMBLY (A1/A7/A2) - 306244

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
1	0309259	SUB-ASSY PWB FRNT PNL BUS PORT		
U4	0309144	ASSY PAL U4 FRNT PNL BUS DTA		
U5	0309145	SASSY PAL U5 FRNT PNL BUS DTA		

FRONT-PANEL BUS SUBASSEMBLY (A1/A7/A2/A1) - 309259

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
C1	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C2	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C3	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C4	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C5	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C6	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C7	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C8	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C9	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C10	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C11	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C12	0035656	CAPACITR 100 MF 20V SOLID TANT POL 10%	T362D107K020AS	05397
C13	0084820	CAPACITR 150 MF 15V SOLID TANT POL AGED	T362D157K015AS W/DOT	05397
C14	0174687	CAPACITR 2200 MF 10V	TLB1A222MCA	
C15	0174687	CAPACITR 2200 MF 10V	TLB1A222MCA	
E1	0177971	CHOKE WIDE-BAND 3B .236X394L	VK20009-3B	
E2	0177971	CHOKE WIDE-BAND 3B .236X394L	VK20009-3B	
J1	0087036	CONN HEADER DBL ROW STRAIGHT 34-PIN	87478-5	
J2	0087451	CONN HEADER DBL ROW STRAIGHT 26-PIN PC	87478-4	
J3	0087229	CONN HEADER SGL ROW STRAIGHT 2-PIN PC	87220-2	
J4	0177099	CONN 34P FEM DBL ROW TOP MT TH	929842-01-17-10	
J5	0087391	CONN HEADER DBL ROW STRAIGHT 20-PIN PC	87478-3	
J6	0087229	CONN HEADER SGL ROW STRAIGHT 2-PIN PC	87220-2	
J7	0175643	CONN HEADER SGL ROW STRAIGHT 5-PIN	MLSS100-5	
J8	0174000	NOT USED ON THIS ASSEMBLY		

L1	0085235	INDUCTOR 1.0 MH FERRITE CHOKE .6A Q-32	6310-12	04213
P6	0086884	JUMPER FEMALE INSULATED .10 SPACING	65474-004	
Q1	0174000	NOT USED ON THIS ASSEMBLY		
R1	0089252	RESISTOR NETWORK 9 4.7K OHM 2% 10 SIP	4310R-101-472	
U1	0177002	IC CMOS BUFFER 10-BIT NONINVRT	AM29C827PC	
U2	0177002	IC CMOS BUFFER 10-BIT NONINVRT	AM29C827PC	
U3	0177003	IC CMOS TRANSCVR BUS 10-BIT	AM29C861/BLA	
U4	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U5	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U6	0177003	IC CMOS TRANSCVR BUS 10-BIT	AM29C861/BLA	
U7	0174000	NOT USED ON THIS ASSEMBLY		
U8	0174000	NOT USED ON THIS ASSEMBLY		
U9	0174000	NOT USED ON THIS ASSEMBLY		
U10	0174000	NOT USED ON THIS ASSEMBLY		
U11	0174000	NOT USED ON THIS ASSEMBLY		
U12	0174000	NOT USED ON THIS ASSEMBLY		
U13	0174000	NOT USED ON THIS ASSEMBLY		
U14	0174000	NOT USED ON THIS ASSEMBLY		
U15	0088053	IC INTERFACE CPU TO KEYBOARD AND DISPLAY	P8279-5	

FRONT-PANEL BUS SUBASSEMBLY (A1/A7/A2/A1) - 309259 (cont.)

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
U16	0174242	IC CMOS FLIP-FLOP TYPE-D OCTAL	MM74HC273N	
U17	0176985	IC CMOS INVERTER HEX OPN DRAIN	SN74HC05N	
U18	0177103	CKT MDLR INVTR 5VDC IN/100VAC	LP505-2-2	
XU1	0177983	SOCKET 24-PIN DIP .3W DUAL LEAF	2-641932-4	
XU2	0177983	SOCKET 24-PIN DIP .3W DUAL LEAF	2-641932-4	
XU3	0177983	SOCKET 24-PIN DIP .3W DUAL LEAF	2-641932-4	
XU4	0177983	SOCKET 24-PIN DIP .3W DUAL LEAF	2-641932-4	
XU5	0177983	SOCKET 24-PIN DIP .3W DUAL LEAF	2-641932-4	
XU6	0177983	SOCKET 24-PIN DIP .3W DUAL LEAF	2-641932-4	
XU15	0177986	SOCKET 40-PIN DIP .3W DUAL LEAF	2-641606-4	

SPEAKER ASSEMBLY (A1/A7/A3) - 309141

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
1	0309665	MOUNT SPEAKER DTA PORTABLE		
LS1	0177398	SPEAKER 3.2 OHM 3.5 SQUARE 2W	3A05	
P1	0174928	CONN RECT M T 3 POS 22AWG .100	CE100F22-3	

AC POWER SUPPLY ASSEMBLY (A1/A8) - 327935

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
1	0459013	PWB POWER SUPPY DTA	PER SA DWG 327910	
2	0459013	HEATSINK PWR SUPPLY DTA	PER SA DWG 327951	
C1	0075417	CAPACITR .01 MF 150V CER DISC Z5V-40+60%	DDM-103	71590
C2	0070544	CAPACITR .001 MF 1KV CER DISC Z5F 10%	DD102	71590
C3	0075417	CAPACITR .01 MF 150V CER DISC Z5V-40+60%	DDM-103	71590
C4	0070544	CAPACITR .001 MF 1KV CER DISC Z5F 10%	DD102	71590
C5	0075417	CAPACITR .01 MF 150V CER DISC Z5V-40+60%	DDM-103	71590
C6	0070544	CAPACITR .001 MF 1KV CER DISC Z5F 10%	DD102	71590
C7	0177201	CAP 2200MF 63V RAD 1.18X1.18	80D222P063KB5	
C8	0170264	CAPACITR 1 MF 100V CER MONO 651 20%	8141-100-651-105M	
C9	0170264	CAPACITR 1 MF 100V CER MONO 651 20%	8141-100-651-105M	
C10	0177201	CAP 2200MF 63V RAD 1.18X1.18	80D222P063KB5	
C11	0177093	CAPACITR 470MF 200V RDL LEADS	80D471P200MB5	
C12	0081101	CAPACITR 1 MF 50V CER MONO 20%	8131-050-651-105M	72982
C13	0081101	CAPACITR 1 MF 50V CER MONO 20%	8131-050-651-105M	72982
C14	0070673	CAPACITR 200 MF 6V	500D207G006DC7	80183
C15	0086013	CAPACITR 22 MF 25V SOLID TANT POL 10%	T362C226K025AS	
C16	0177093	CAPACITR 470MF 200V RDL LEADS	80D471P200MB5	
C17	0170263	CAPACITR 100 MF 20V	672D107H020CG5C	
C18	0170263	CAPACITR 100 MF 20V	672D107H020CG5C	
C19	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C20	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C21	0070544	CAPACITR .001 MF 1KV CER DISC Z5F 10%	DD102	71590
C22	0070544	CAPACITR .001 MF 1KV CER DISC Z5F 10%	DD102	71590
C23	0070544	CAPACITR .001 MF 1KV CER DISC Z5F 10%	DD102	71590
CR1	0071122	DIODE 1N914 SIL 75V 75MA	1N914	80368
CR2	0071122	DIODE 1N914 SIL 75V 75MA	1N914	80368
CR3	0173972	DIODE VHE1402 SIL 100V 10A TO 220V	VHE1402	
CR4	0173972	DIODE VHE1402 SIL 100V 10A TO 220V	VHE1402	
CR5	0078274	DIODE 1N4002 SIL 100V 1A	1N4002	04713
CR6	0078274	DIODE 1N4002 SIL 100V 1A	1N4002	04713
CR7	0077488	DIODE 1N4737A SI ZEN 7.5V 5% 1W	1N4737A	04713
CR8	0175558	RECTIFIER ASSY 600V 5A	PE60	
DS1	0171535	LAMP LED GRN .115 DIA..135 LNG 2.5V 30MA	HLMP-1523	
DS2	0171535	LAMP LED GRN .115 DIA..135 LNG 2.5V 30MA	HLMP-1523	
J1	0177171	CONN HEADER SGL ROW STRAIGHT 12-PIN .156	CLN-1012-1C110-JPD	
J2	0174930	CONN HEADER SGL ROW STRAIGHT 3-PIN LK	MLSS100-3	
J3	0177171	CONN HEADER SGL ROW STRAIGHT 12-PIN .156	CLN-1012-1C110-JPD	

K1	0177095	RELAY 6VDC DPDT PC MT 10A CNC	TYP154-2C-6VDC	
L1		NOT USED		
L2	0085235	INDUCTOR 1.0 MH FERRITE CHOKE .6A Q-32	6310-12	04213
L3	0327919	INDUCTOR POWER TOROIDAL	PER SA DWG 327919	
L4	0327919	INDUCTOR POWER TOROIDAL	PER SA DWG 327919	
Q1	0077148	TRANSSTR 2N3251 PNP SIL	2N3251	04713
Q2	0077148	TRANSSTR 2N3251 PNP SIL	2N3251	04713
Q3	0077147	TRANSSTR 2N3947 NPN SIL	2N3947	04713
Q4	0077147	TRANSSTR 2N3947 NPN SIL	2N3947	04713
R1	0074696	RESISTOR 470 OHM 1/4W 5% COMP	RCR07G471JS	01121
R2	0074696	RESISTOR 470 OHM 1/4W 5% COMP	RCR07G471JS	01121
R3	0078924	RESISTOR 20.0K OHM RN55C 1% MTL FLM	RN55C2002F	
R4	0078933	RESISTOR 10.0K OHM RN55C 1% MTL FLM	RN55C1002F	
R5	0072080	RESISTOR 47K OHM 2W 10% COMP	RCR42G473KS	01121
R6	0174000	NOT USED ON THIS ASSEMBLY		
R7	0174000	NOT USED ON THIS ASSEMBLY		
R8	0079728	RESISTOR 9.09K OHM RN55C 1% MTL FLM	RN55C9091F	
R9	0087840	POT 10K OHM 1/2W CER 3/8 SQ VERT ADJ 25T	3299W-1-103	
R10	0085790	RESISTOR 330K OHM 1/4W 5% COMP	RCR07G334JS	01121
R11	0174000	NOT USED ON THIS ASSEMBLY		

AC POWER SUPPLY ASSEMBLY (A1/A8) - 327935 (cont.)

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
R12	0174000	NOT USED ON THIS ASSEMBLY		
R13	0079728	RESISTOR 9.09K OHM RN55C 1% MTL FLM	RN55C9091F	
R14	0087840	POT 10K OHM 1/2W CER 3/8 SQ VERT ADJ 2ST	3299W-1-103	
R15	0072170	RESISTOR 560K OHM 1/4W 10% COMP	RCR07G564KS	01121
R16	0074702	RESISTOR 1.0K OHM 1/4W 5% COMP	RCR07G102JS	01121
R17	0074724	RESISTOR 6.8K OHM 1/4W 5% COMP	RCR07G682JS	01121
R18	0085790	RESISTOR 330K OHM 1/4W 5% COMP	RCR07G334JS	01121
R19	0078933	RESISTOR 10.0K OHM RN55C 1% MTL FLM	RN55C1002F	
R20	0072080	RESISTOR 47K OHM 2W 10% COMP	RCR42G473KS	01121
R21	0075687	RESISTOR 47K OHM 1/4W 5% COMP	RCR07G473JS	01121
R22	0074704	RESISTOR 1.2K OHM 1W 10% COMP	RCR32G122KS	01121
R23	0071968	RESISTOR 1.5K OHM 1W 10% COMP	RCR32G152KS	01121
R24	0071859	RESISTOR 33 OHM 1W 10% COMP	RCR32G330KS	01121
R25	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R26	0174000	NOT USED ON THIS ASSEMBLY		
R27	0174000	NOT USED ON THIS ASSEMBLY		
R28	0174000	NOT USED ON THIS ASSEMBLY		
R29	0174000	NOT USED ON THIS ASSEMBLY		
R30	0071839	RESISTOR 10 OHM 2W 10% COMP	RCR42G100KS	01121
R31	0082149	RESISTOR 64.9K OHM RN60C 1% MTL FLM	RN60C6492F	
R32	0083876	RESISTOR 499 OHM RN55C 1% MTL FLM	RN55C4990F	
R33	0083878	RESISTOR 562 OHM RN55C 1% MTL FLM	RN55C5620F	
RT1		NOT USED		
RT2	0175602	THERMSTR 47 OHM DISC 25 DEG C	CL-80	
RV1	0081844	VARISTOR 150V RMS .5 WATTS	V150LA10A	24446
RV2	0081844	VARISTOR 150V RMS .5 WATTS	V150LA10A	24446
TP3	0082909	TERMINAL PRESS MT DISCONNECT .058-PIN	60599-1	00779
U1	0177094	CKT MDLR CNVTR 200-400V/5VDCOUT	VI-220-CX	
U2	0177094	CKT MDLR CNVTR 200-400V/5VDCOUT	VI-220-CX	
U3		NOT USED		
U4	0172179	IC COMPARATOR - VOLTAGE 8L - DIP DUAL	LM393N	
U5	0174715	OPTO-ISOLA 3.55KVDC NPN PXSTR	4N35	

AC/DC POWER SUPPLY ASSEMBLY (A1/A8) - 327911

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
1	0327910	PWB POWER SUPPY DTA	PER SA DWG 327910	
2	0327951	HEATSINK PWR SUPPLY DTA	PER SA DWG 327951	
C1	0075417	CAPACITR .01 MF 150V CER DISC Z5V-40+60%	DDM-103	71590
C2	0070544	CAPACITR .001 MF 1KV CER DISC Z5F 10%	DD102	71590
C3	0075417	CAPACITR .01 MF 150V CER DISC Z5V-40+60%	DDM-103	71590
C4	0070544	CAPACITR .001 MF 1KV CER DISC Z5F 10%	DD102	71590
C5	0075417	CAPACITR .01 MF 150V CER DISC Z5V-40+60%	DDM-103	71590
C6	0070544	CAPACITR .001 MF 1KV CER DISC Z5F 10%	DD102	71590
C7	0177201	CAP 2200MF 63V RAD 1.18X1.18	80D222P063KB5	
C8	0170264	CAPACITR 1 MF 100V CER MONO 651 20%	8141-100-651-105M	
C9	0170264	CAPACITR 1 MF 100V CER MONO 651 20%	8141-100-651-105M	
C10	0177201	CAP 2200MF 63V RAD 1.18X1.18	80D222P063KB5	
C11	0177093	CAPACITR 470MF 200V RDL LEADS	80D471P200MB5	
C12	0081101	CAPACITR 1 MF 50V CER MONO 20%	8131-050-651-105M	72982
C13	0081101	CAPACITR 1 MF 50V CER MONO 20%	8131-050-651-105M	72982
C14	0070673	CAPACITR 200 MF 6V	500D207G006DC7	80183
C15	0086013	CAPACITR 22 MF 25V SOLID TANT POL 10%	T362C226K025AS	
C16	0177093	CAPACITR 470MF 200V RDL LEADS	80D471P200MB5	
C17	0170263	CAPACITR 100 MF 20V	672D107H020CG5C	
C18	0170263	CAPACITR 100 MF 20V	672D107H020CG5C	
C19	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C20	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C21	0070544	CAPACITR .001 MF 1KV CER DISC Z5F 10%	DD102	71590
C22	0070544	CAPACITR .001 MF 1KV CER DISC Z5F 10%	DD102	71590
C23	0070544	CAPACITR .001 MF 1KV CER DISC Z5F 10%	DD102	71590
CR1	0071122	DIODE 1N914 SIL 75V 75MA	1N914	80368
CR2	0071122	DIODE 1N914 SIL 75V 75MA	1N914	80368
CR3	0173972	DIODE VHE1402 SIL 100V 10A TO 220V	VHE1402	
CR4	0173972	DIODE VHE1402 SIL 100V 10A TO 220V	VHE1402	
CR5	0078274	DIODE 1N4002 SIL 100V 1A	1N4002	04713
CR6	0078274	DIODE 1N4002 SIL 100V 1A	1N4002	04713
CR7	0077488	DIODE 1N4737A SI ZEN 7.5V 5% 1W	1N4737A	04713
CR8	0175558	RECTIFIER ASSY 600V 5A	PE60	
DS1	0171535	LAMP LED GRN .115 DIA..135 LNG 2.5V 30MA	HLMP-1523	
DS2	0171535	LAMP LED GRN .115 DIA..135 LNG 2.5V 30MA	HLMP-1523	
J1	0177171	CONN HEADER SGL ROW STRAIGHT 12-PIN .156	CLN-1012-1C110-JPD	
J2	0174930	CONN HEADER SGL ROW STRAIGHT 3-PIN LK	MLSS100-3	
J3	0177171	CONN HEADER SGL ROW STRAIGHT 12-PIN .156	CLN-1012-1C110-JPD	

K1	0177095	RELAY 6VDC DPDT PC MT 10A CNC	TYP154-2C-6VDC	
L1	0327919	INDUCTOR POWER TOROIDAL	PER SA DWG 327919	
L2	0085235	INDUCTOR 1.0 MH FERRITE CHOKE .6A Q-32	6310-12	04213
L3	0327919	INDUCTOR POWER TOROIDAL	PER SA DWG 327919	
L4	0327919	INDUCTOR POWER TOROIDAL	PER SA DWG 327919	
Q1	0077148	TRANSSTR 2N3251 PNP SIL	2N3251	04713
Q2	0077148	TRANSSTR 2N3251 PNP SIL	2N3251	04713
Q3	0077147	TRANSSTR 2N3947 NPN SIL	2N3947	04713
Q4	0077147	TRANSSTR 2N3947 NPN SIL	2N3947	04713
R1	0074696	RESISTOR 470 OHM 1/4W 5% COMP	RCR07G471JS	01121
R2	0074696	RESISTOR 470 OHM 1/4W 5% COMP	RCR07G471JS	01121
R3	0078924	RESISTOR 20.0K OHM RN55C 1% MTL FLM	RN55C2002F	
R4	0078933	RESISTOR 10.0K OHM RN55C 1% MTL FLM	RN55C1002F	
R5	0072080	RESISTOR 47K OHM 2W 10% COMP	RCR42G473KS	01121
R6	0174000	NOT USED ON THIS ASSEMBLY		
R7	0174000	NOT USED ON THIS ASSEMBLY		
R8	0079728	RESISTOR 9.09K OHM RN55C 1% MTL FLM	RN55C9091F	
R9	0087840	POT 10K OHM 1/2W CER 3/8 SQ VERT ADJ 25T	3299W-1-103	
R10	0085790	RESISTOR 330K OHM 1/4W 5% COMP	RCR07G334JS	01121
R11	0174000	NOT USED ON THIS ASSEMBLY		

AC/DC POWER SUPPLY ASSEMBLY (A1/A8) - 327911 (cont.)

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
R12	0174000	NOT USED ON THIS ASSEMBLY		
R13	0079728	RESISTOR 9.09K OHM RN55C 1% MTL FLM	RN55C9091F	
R14	0087840	POT 10K OHM 1/2W CER 3/8 SQ VERT ADJ 25T	3299W-1-103	
R15	0072170	RESISTOR 560K OHM 1/4W 10% COMP	RCR07G564KS	01121
R16	0074702	RESISTOR 1.0K OHM 1/4W 5% COMP	RCR07G102JS	01121
R17	0074724	RESISTOR 6.8K OHM 1/4W 5% COMP	RCR07G682JS	01121
R18	0085790	RESISTOR 330K OHM 1/4W 5% COMP	RCR07G334JS	01121
R19	0078933	RESISTOR 10.0K OHM RN55C 1% MTL FLM	RN55C1002F	
R20	0072080	RESISTOR 47K OHM 2W 10% COMP	RCR42G473KS	01121
R21	0075687	RESISTOR 47K OHM 1/4W 5% COMP	RCR07G473JS	01121
R22	0074704	RESISTOR 1.2K OHM 1W 10% COMP	RCR32G122KS	01121
R23	0071968	RESISTOR 1.5K OHM 1W 10% COMP	RCR32G152KS	01121
R24	0071859	RESISTOR 33 OHM 1W 10% COMP	RCR32G330KS	01121
R25	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R26	0174000	NOT USED ON THIS ASSEMBLY		
R27	0174000	NOT USED ON THIS ASSEMBLY		
R28	0174000	NOT USED ON THIS ASSEMBLY		
R29	0174000	NOT USED ON THIS ASSEMBLY		
R30	0071839	RESISTOR 10 OHM 2W 10% COMP	RCR42G100KS	01121
R31	0082149	RESISTOR 64.9K OHM RN60C 1% MTL FLM	RN60C6492F	
R32	0083876	RESISTOR 499 OHM RN55C 1% MTL FLM	RN55C4990F	
R33	0083878	RESISTOR 562 OHM RN55C 1% MTL FLM	RN55C5620F	
RT1	0177181	THERMSTR 50 OHM DISC 25 DEG 6A LMT	CL-40	
RT2	0175602	THERMSTR 47 OHM DISC 25 DEG C	CL-80	
RV1	0081844	VARISTOR 150V RMS .5 WATTS	V150LA10A	24446
RV2	0081844	VARISTOR 150V RMS .5 WATTS	V150LA10A	24446
TP3	0082909	TERMINAL PRESS MT DISCONNECT .058-PIN	60599-1	00779
U1	0177203	CKT MDLR CNVTR 20-56V/5VDCOUT	VI-220-CX	
U2	0177203	CKT MDLR CNVTR 20-56V/5VDCOUT	VI-220-CX	
U3	0177202	CKT MDLR CNVTR 200-400V/24VDC	VI-263-CU	
U4	0172179	IC COMPARATOR - VOLTAGE 8L - DIP DUAL	LM393N	
U5	0174715	OPTO-ISOLA 3.55KVDC NPN PXSTR	4N35	

CHAPTER 5
DIAGRAMS

The assembly drawings are first. The schematics and circuit card diagrams are in couples and in order by reference designator; for example, the Demux Board Assembly (A1) schematic is on a page facing the Demux Board Assembly drawing. You can find, for example, DS3 Pattern Generator Chip U3 on the schematic and on the circuit board without turning the page.

Figure Number	Drawing Number	Title	Page
5.1	309110	Model AT 9500 Portable DTA Top Assembly	5-3
5.2	309100	Model AT 9500 Portable DTA AC/DC Top Assembly	5-4
5.3	327946A	Input Wiring Harness	5-5
5.4	327953	Power Cable Assembly	5-6
5.5	327959	Fan Assembly	5-7
5.6	309137	Output Cable Assembly	5-8
5.7	327970P	DS3-DS1/DS0 Demux DTA PWB Assembly	5-9
5.8	307223	DS3-DS1/DS0 Demux DTA PWB Subassembly	5-10
5.9	306221	DS3-DS1/DS0 Demux DTA PWB Subassembly Schematic	5-11
5.10	306222	Cable	5-12
5.11	327996C	Analog DTA PWB Assembly	5-13
5.12	456952	Analog/Demux Cable Assembly	5-15
5.13	456953	Analog/Demux Cable Assembly	5-16
5.14	327989D	Analog DTA PWB Subassembly	5-17
5.15	327987	Analog DTA PWB Subassembly Schematic	5-18
5.16	309274	Delay Line 75 Ohm 10ns	5-24
5.17	327969E	DS1/DS3 Transmitter PWB Assembly	5-25
5.18	327890B	DS1/DS3 Transmitter PWB Subassembly	5-26
5.19	327888C	DS1/DS3 Transmitter PWB Subassembly Schematic	5-27
5.20	309123C	Transmitter PWB Assembly	5-37
5.21	309237E	Transmitter PWB Subassembly	5-38
5.22	309235C	Transmitter PWB Subassembly Schematic	5-39
5.23	327968F	Real-Time Clock PWB Assembly	5-45

Figure Number	Drawing Number	Title	Page
5.24	458359	Real-Time Clock PWB Subassembly	5-46
5.25	458358	Real-Time Clock PWB Subassembly Schematic	5-47
5.26	307219N	CPU PWB Assembly	5-57
5.27	307218	CPU PWB Subassembly	5-58
5.28	307216	CPU PWB Subassembly Schematic	5-59
5.29	327922D	Mothercard PWB Assembly	5-60
5.30	327920B	Mothercard PWB Assembly Schematic	5-61
5.31	309103	Front-panel Assembly	5-71
5.32	309256A	Front-panel LED PWB Assembly	5-72
5.33	309254	Front-panel LED PWB Assembly Schematic	5-73
5.34	306244	Front-panel Bus PWB Assembly	5-74
5.35	309259	Front-panel Bus PWB Subassembly	5-75
5.36	309257	Front-panel Bus PWB Subassembly Schematic	5-76
5.37	309141A	Speaker Assembly	5-77
5.38	327964	DS0 Cable Assembly	5-78
5.39	456958A	Audio Cable	5-79
5.40	327948	Display Cable Assembly	5-80
5.41	327966	Front-panel Interface Cable Assembly	5-81
5.42	327982	Front-panel Interface Cable Assembly	5-82
5.43	456954	DS1 Cable Assembly	5-83
5.44	456956	DS3 22-inch Cable Assembly	5-84
5.45	456955	DS3 28-inch Cable Assembly	5-85
5.46	327935	AC Power Supply Assembly	5-86
5.47	327911A	AC/DC Power Supply Assembly	5-87
5.48	327909A	AC Power Supply Schematic	5-88
5.49	327910	AC Power Supply PWB Assembly	5-89

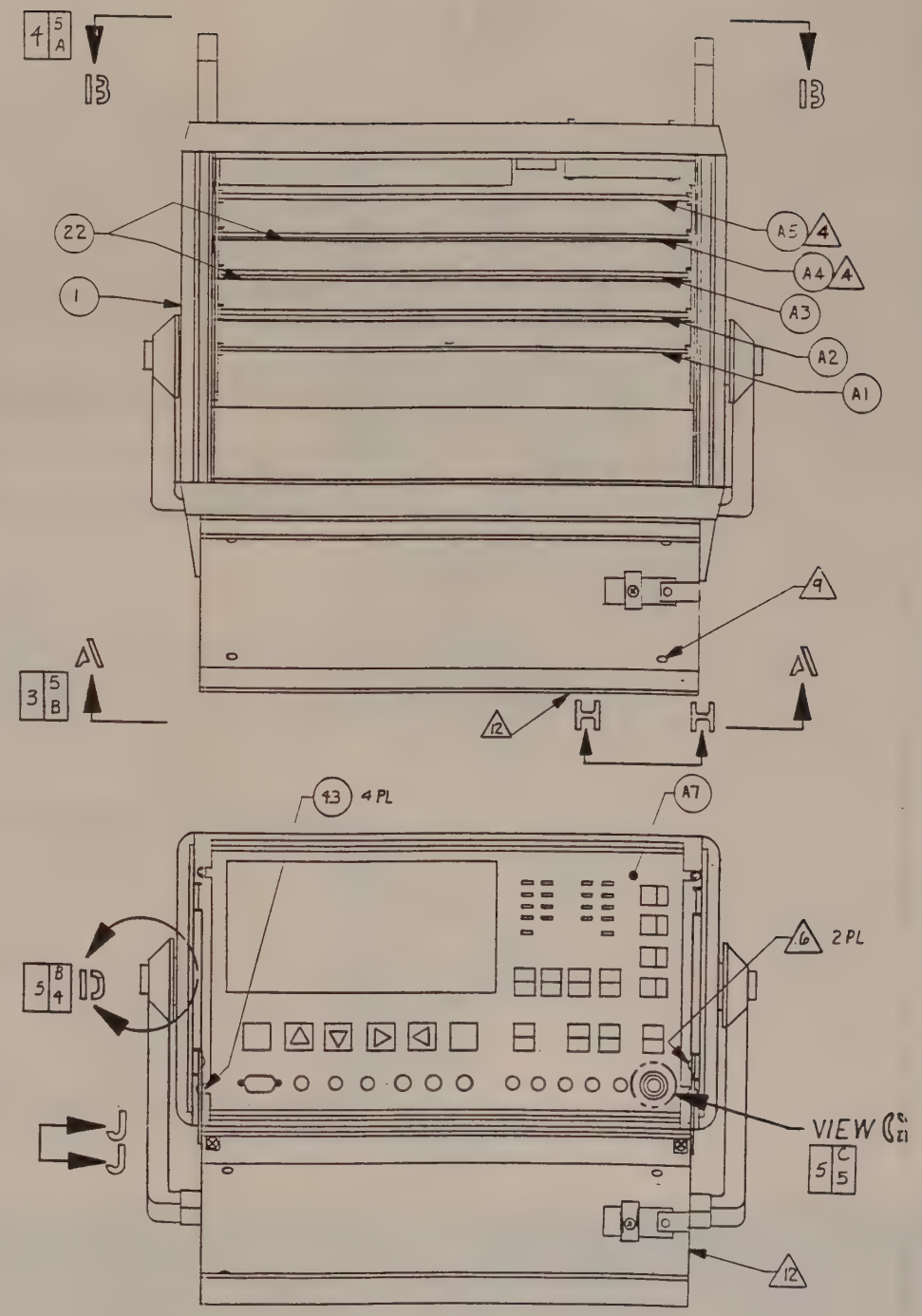


Figure 5.1. **Model AT 9500 Portable DTA Top Assembly (A1)**

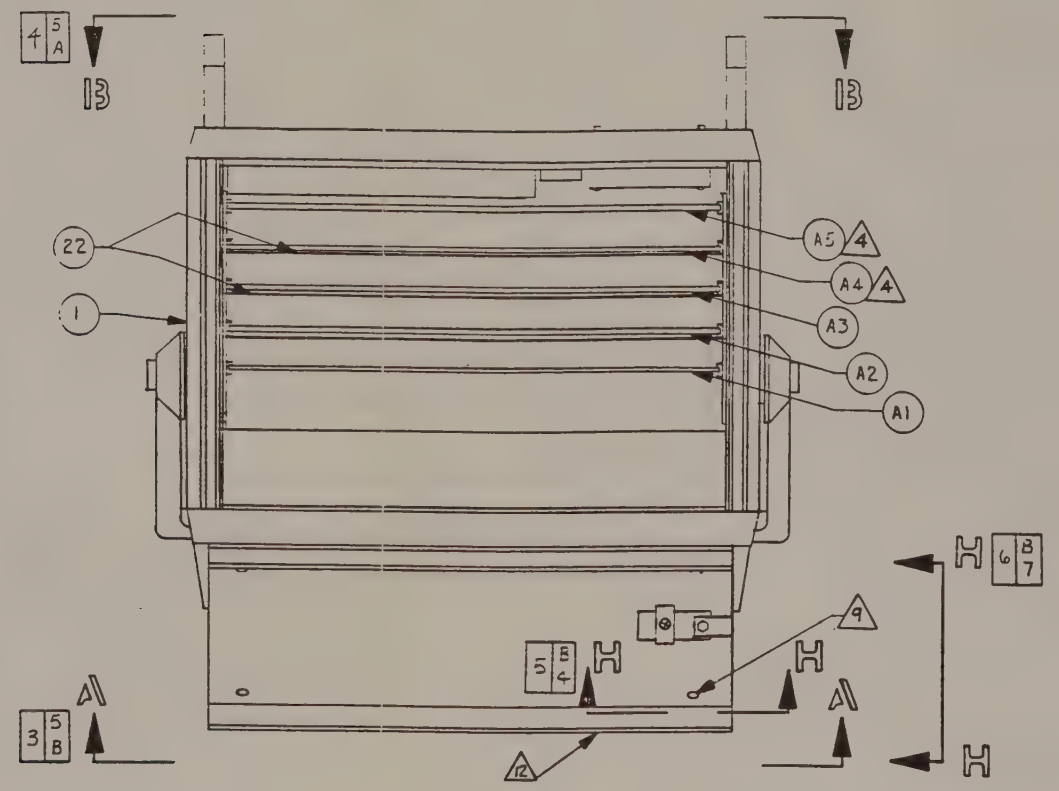


Figure 5.2. Model AT 9500 Portable DTA AC/DC Top Assembly (A1)

NOTES:

1. J1-1(7) TO XF1-T
   J1-2(5) TO GND
   J1-3(9) TO XF2-T
   J1-4 NO CONNECTION

2. XF1-R (7) TO P1-11
   XF1-T (7) TO J1-1
   XF2-R (9) TO P1-12
   XF2-T (9) TO J1-3

3. THESE 3 WIRES ARE TO BE SEPARATED FROM MAIN PART OF HARNESS WHERE SHOWN. DO NOT USE WIRE TIES HERE.

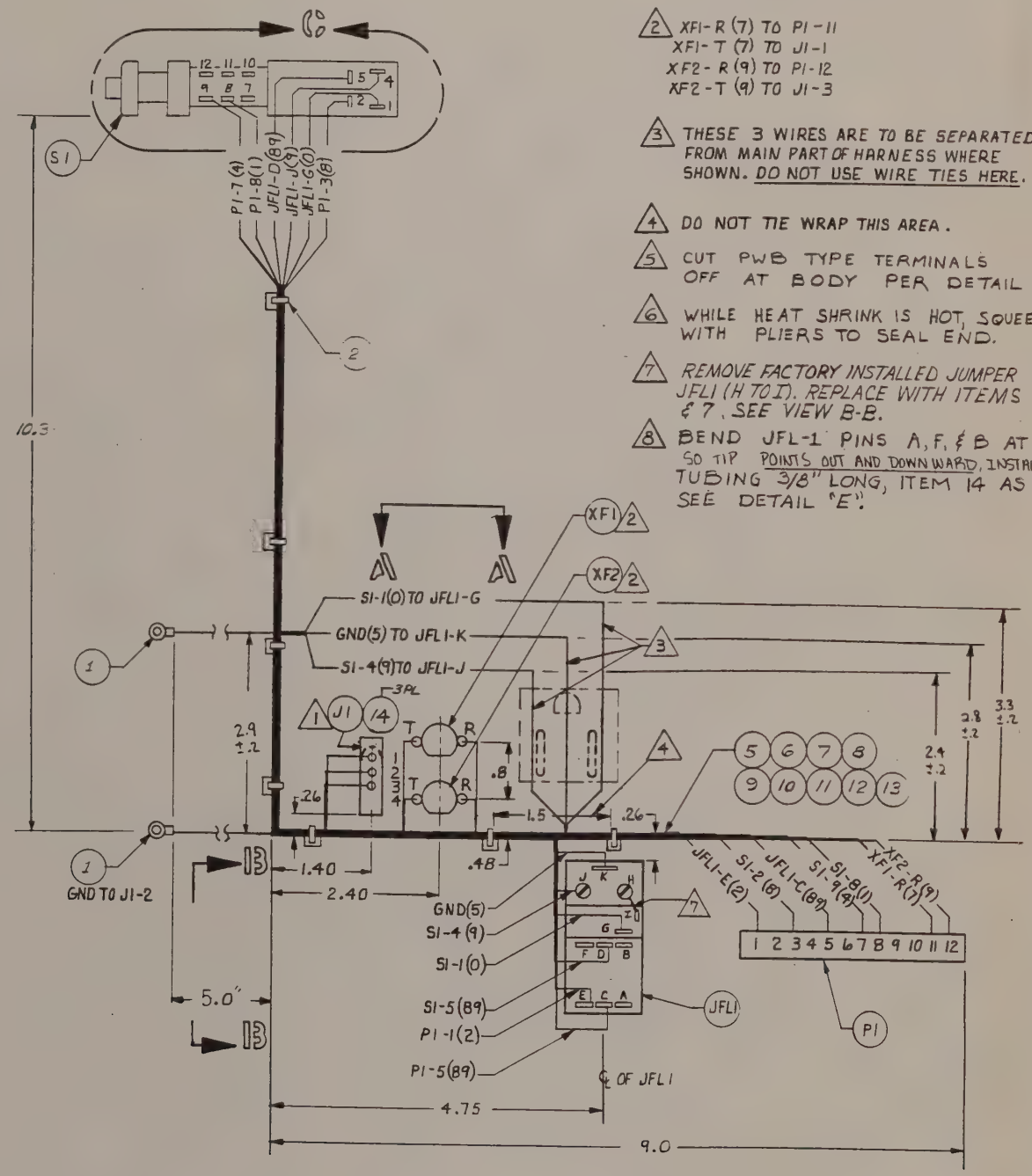
4. DO NOT TIE WRAP THIS AREA.

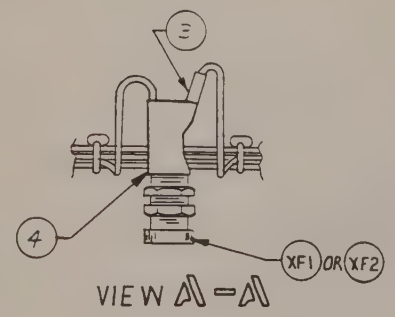
5. CUT PWB TYPE TERMINALS OFF AT BODY PER DETAIL "D."

6. WHILE HEAT SHRINK IS HOT, SQUEEZE WITH PLIERS TO SEAL END.

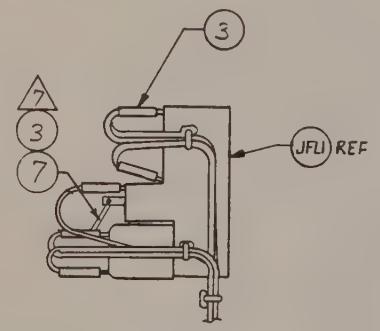
7. REMOVE FACTORY INSTALLED JUMPER ON JFL1 (H TO I). REPLACE WITH ITEMS 3 & 7, SEE VIEW B-B.

8. BEND JFL-1 PINS A, F, & B AT EYELET SO TIP POINTS OUT AND DOWNWARD. INSTALL HEATSHRINK TUBING 3/8" LONG, ITEM 14 AS SHOWN. SEE DETAIL "E".

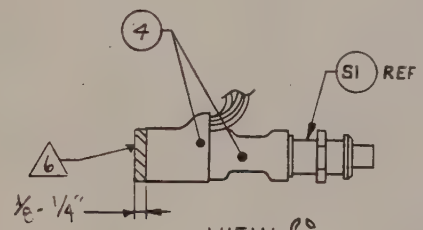




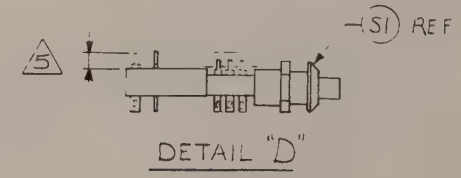
VIEW A-A



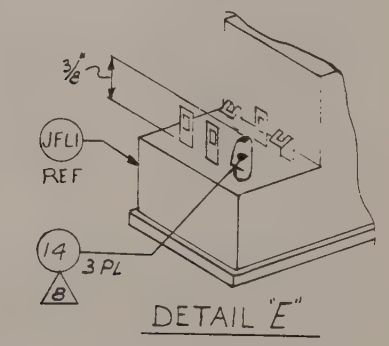
VIEW B-B



VIEW C

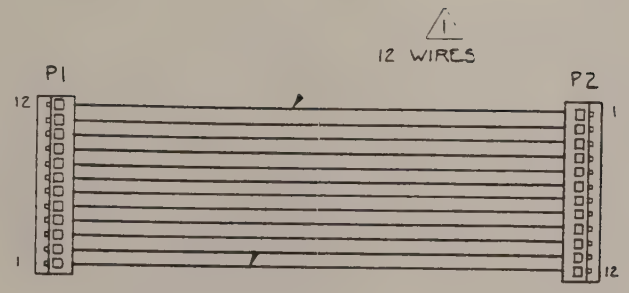


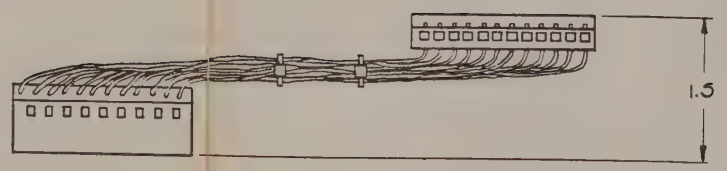
DETAIL "D"

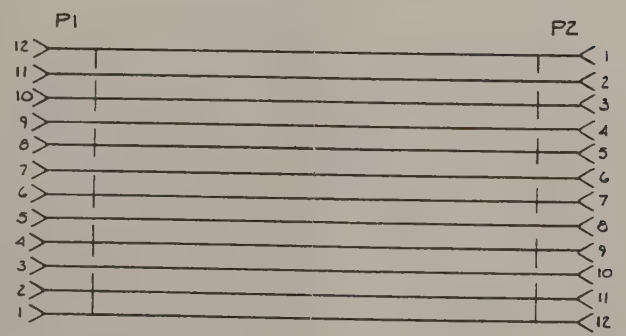


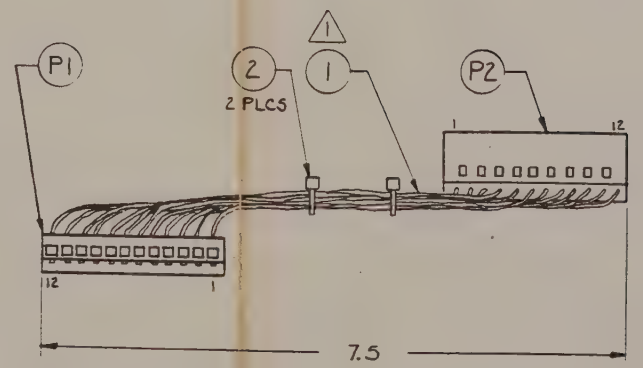
DETAIL "E"

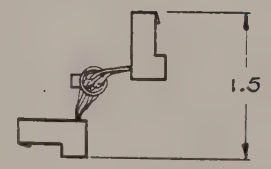
Figure 5.3. Input Wiring Harness (A1/W1)









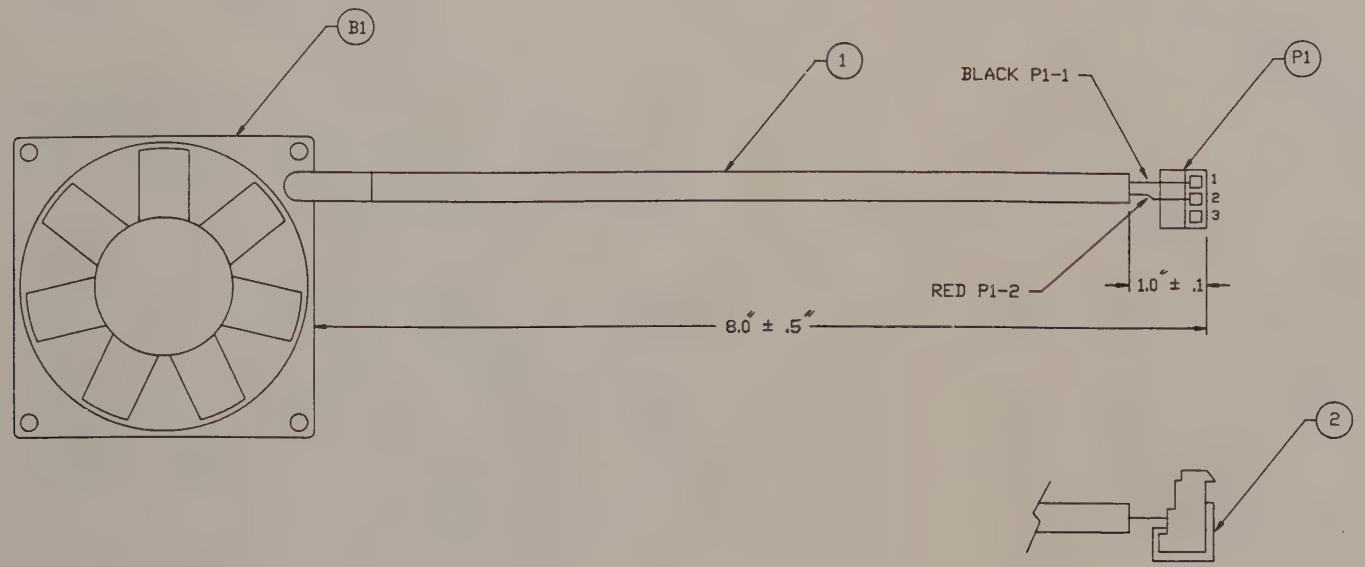


NOTES:

1. A) CUT WIRES TO 7.0 LG , 12 PLACES
   B) INSERT WIRES IN P1 , ENSURE WIRE ENDS ARE FLUSH AGAINST CONNECTOR CAP STOP
   C) PRESS CAP INTO CONNECTOR
   D) REPEAT P1 PROCESS FOR P2
   E) FORM CABLE AS SHOWN.

ITEM OR FIND NO.	QTY REQD	S-A STOCK NO	NOMENCLATURE OR DESCRIPTION	MATL SPEC AND SIZE OR COMPONENT VALUE	IDENTIFYING OR PART NO	FSCM NO
PARTS LIST						
P2	1	177096	CONN, WIREMOUNT, SKT	12 NO. 18 AWG CNTCTS	3M CLG-1012-00101D-CGR	
P1	1	177096	CONN, WIREMOUNT, SKT	12 NO. 18 AWG CNTCTS	3M CLG-1012-00101D-CGR	
2	2	73045	CABLE TIE	4 IN. LG. REMOVABLE	PANDUIT SST1M	
1	.6 FT	73356	WIRE, WHITE	NO. 18 AWG STRANDED	MIL-W-16878D	

Figure 5.4. Power Cable Assembly (A1/W3)

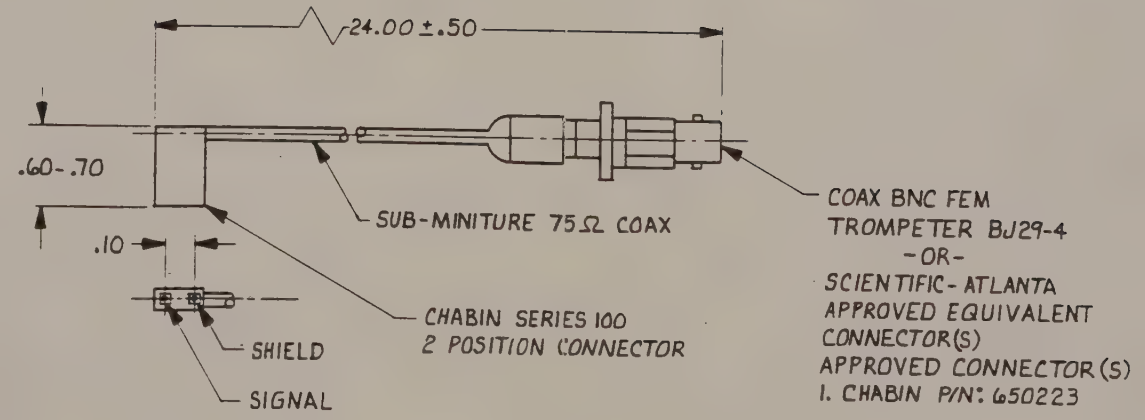


ITEM	QTY	S.A. STK NO.	DESCRIPTION	SPEC AND SIZE OR VALUE	IDENTIFYING NO.
PARTS LIST					
2	1	174929	COVER	3 PIN .1 SP	PANDUIT CE100F-3
1	.6 FT	73212	TUBING	#8	
B1	1	177178	FAN	5VDC 440mA	SANGYO FDC80-05M
P1	1	176026	CONN, RECT 1DC	3 CONT. 24 AWG	PANDUIT CE100F24-3

Figure 5.5. Fan Assembly (A1/W4)

NOTES:

1. ONLY THE ITEM DESCRIBED ON THIS DRAWING WHEN PROCURED FROM THE SUPPLIER LISTED HEREON IS APPROVED BY PRODUCTION ENGINEERING FOR USE IN THE APPLICATION(S) SPECIFIED HEREON. A SUBSTITUTE ITEM SHALL NOT BE USED WITHOUT PRIOR TESTING AND APPROVAL BY PRODUCTION ENGINEERING.
2. IDENTIFICATION OF THE APPROVED SOURCE HEREON IS NOT TO BE CONSTRUED AS A GUARANTEE OF PRESENT OR CONTINUED AVAILABILITY AS A SOURCE OF SUPPLY FOR THE ITEMS DESCRIBED ON THE DRAWING.



APPROVED SOURCE OF SUPPLY

CHABIN 3M PRODUCTS
890 FORTRESS STREET
CHICO, CA 95926
(916) 891-6410
PART NO. 98160H-020-024.00

Figure 5.6. **Output Cable Assembly (A1/W5 – A1/W6)**

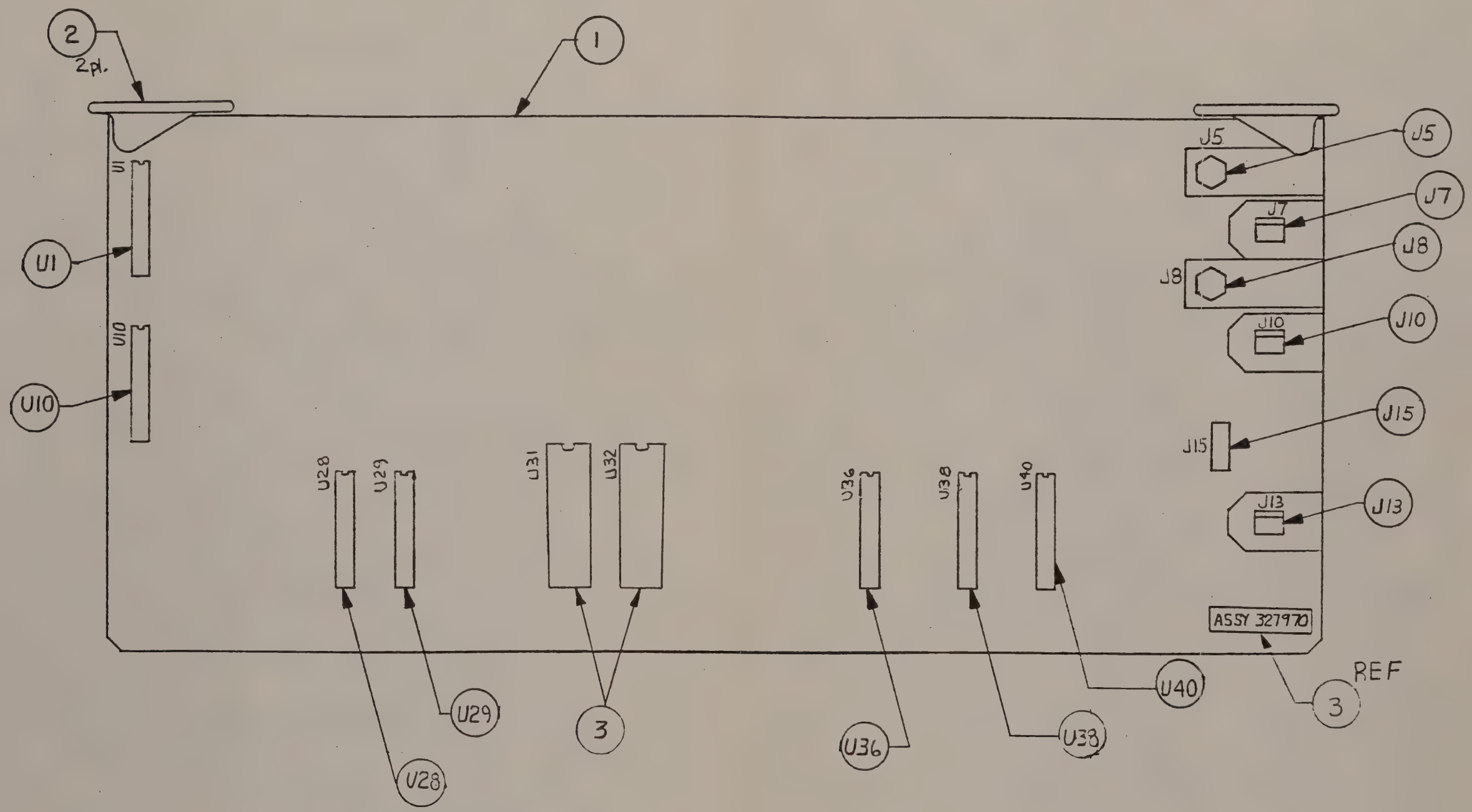
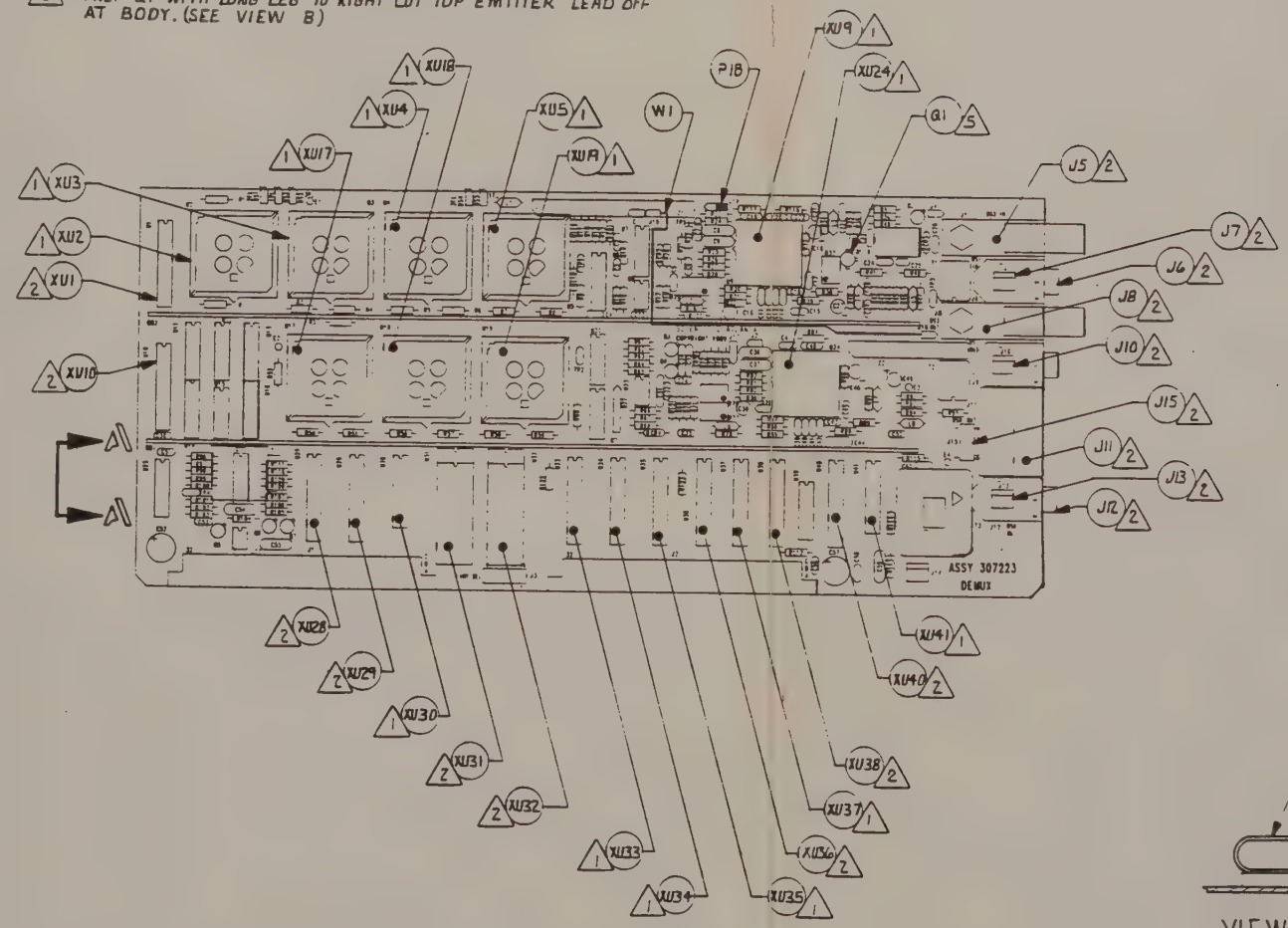


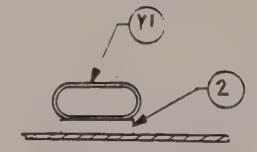
Figure 5.7. DS3–DS1/DS0 Demux
DTA PWB Assembly (A1/A1)

NOTES:

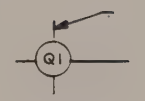
1. INSTALL THE FOLLOWING AFTER WAVE SOLDER: U2, U3, U4, U5, U9, U17, U18, U19, U24, U30, U33, U34, U35, U37, AND U41.
2. INSTALL THE FOLLOWING AT NEXT HIGHER ASSEMBLY: U1, U10, U28, U29, U31, U32, U36, U38, U40, J5, J6, J7, J8, J9, J10, J11, J12, J13, AND J15.
3. NOTE LOCATION OF PIN 1 ON ITEMS XU2, XU3, XU4, XU5, XU9, XU17, XU18, XU19, AND XU24.
4. ADD ITEM 2 TO Y1 BEFORE MOUNTING ON PWB. (SEE VIEW A-A)
5. PREP Q1 WITH LONG LEG TO RIGHT CUT TOP EMITTER LEAD OFF AT BODY. (SEE VIEW B)



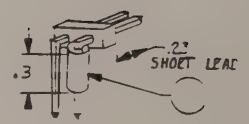
6. INSTALL J19 WITH ONE SPACER ITEM 5 AS SHOWN PER "VIEW C" ORIENT AS SHOWN ON DRAWING.
7. ORIENT J16 AS SHOWN ON DRAWING.
8. INSTALL W1 WITH SIDE EXIT CABLE POSITIONED AS SHOWN. ON J16 TURN WIRE DOWN TOWARDS PWB.



VIEW A-A
SCALE: NONE



VIEW B
SCALE: NONE



VIEW C
SCALE: NONE

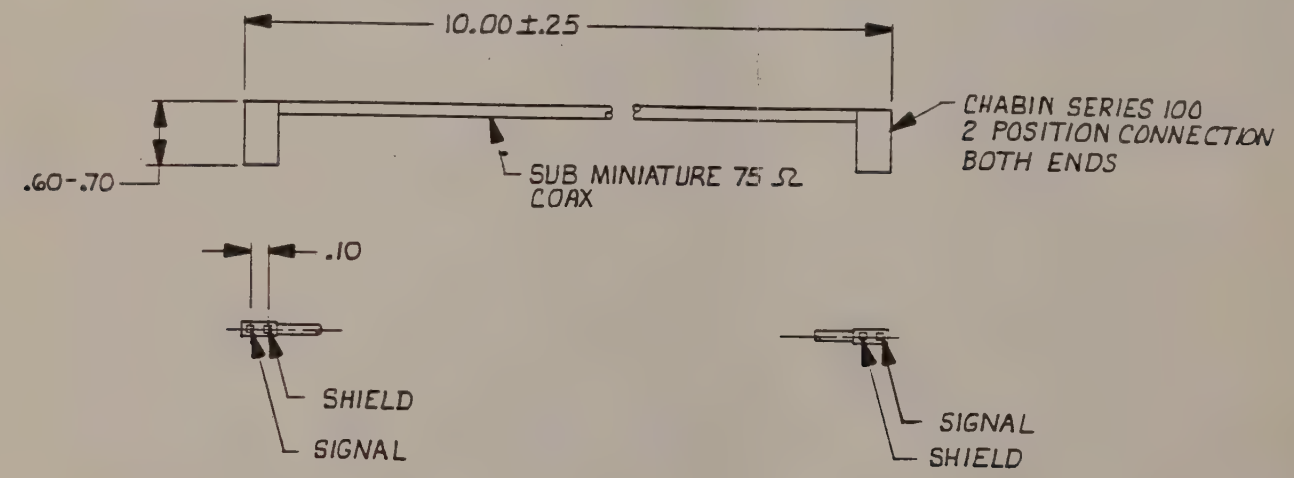
SEE SEPARATE PARTS LIST

Figure 5.8. DS3–DS1/DS0 Demux DTA PWB Subassembly (A1/A1/A1)

NOTES:

1. ONLY THE ITEM DESCRIBED ON THIS DRAWING WHEN PROCURED FROM THE SUPPLIER LISTED HEREON IS APPROVED BY PRODUCTION ENGINEERING FOR USE IN THE APPLICATION(S) SPECIFIED HEREON. A SUBSTITUTE ITEM SHALL NOT BE USED WITHOUT PRIOR TEST AND APPROVAL BY PRODUCTION ENGINEERING.

2. IDENTIFICATION OF THE APPROVED SOURCE HEREON IS NOT TO BE CONSTRUED AS A GUARANTEE OF PRESENT OR CONTINUED AVAILABILITY AS A SOURCE OF SUPPLY FOR THE ITEMS DESCRIBED ON THE DRAWING.



APPROVED SOURCE OF SUPPLY

CHABIN 3M PRODUCTS
890 FORTRESS STREET
CHICO, CA. 95926
(916) 891-6410
PN: 981616-020-010.00

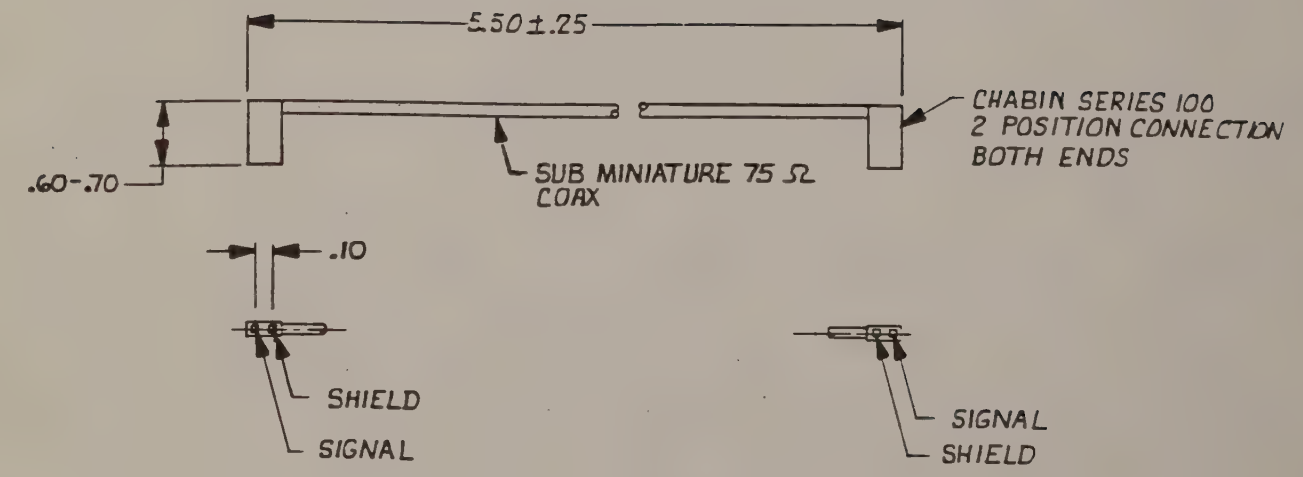
Figure 5.9. DS3–DS1/DS0 Demux DTA PWB Subassembly Schematic (A1/A1/A1)

306221
351052Z

NOTES:

1. ONLY THE ITEM DESCRIBED ON THIS DRAWING WHEN PROCURED FROM THE SUPPLIER LISTED HEREON IS APPROVED BY PRODUCTION ENGINEERING FOR USE IN THE APPLICATION(S) SPECIFIED HEREON. A SUBSTITUTE ITEM SHALL NOT BE USED WITHOUT PRIOR TEST AND APPROVAL BY PRODUCTION ENGINEERING.

2. IDENTIFICATION OF THE APPROVED SOURCE HEREON IS NOT TO BE CONSTRUED AS A GUARANTEE OF PRESENT OR CONTINUED AVAILABILITY AS A SOURCE OF SUPPLY FOR THE ITEMS DESCRIBED ON THE DRAWING.



APPROVED SOURCE OF SUPPLY

CHABIN 3M PRODUCTS
890 FORTRESS STREET
CHICO, CA. 95926
(916) 891-6410
PN: 981616-020-005.50

Figure 5.10. Cable (A1/A1/A1/W1)

NOTES:

1. PLUG CABLE W2 TO J13
   PLUG CABLE W3 TO J14

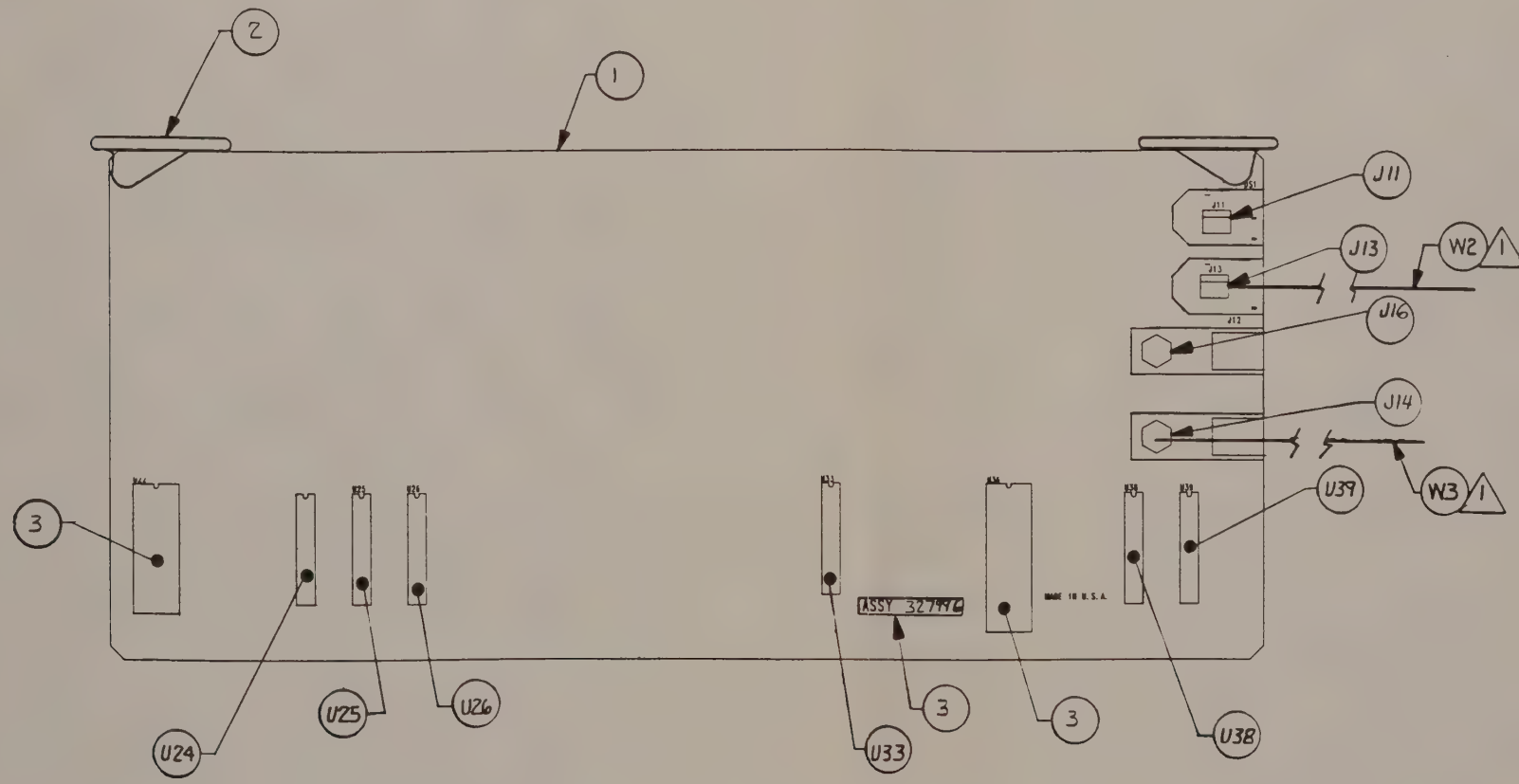


Figure 5.11. Analog DTA PWB Assembly (A1/A2) (Sheet 1 of 2)

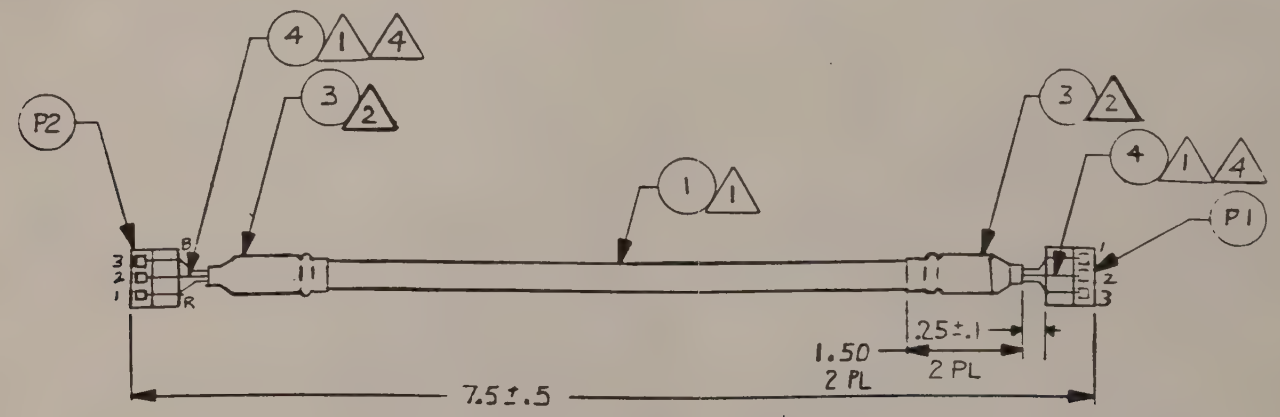
EPROM AND PAL CHART

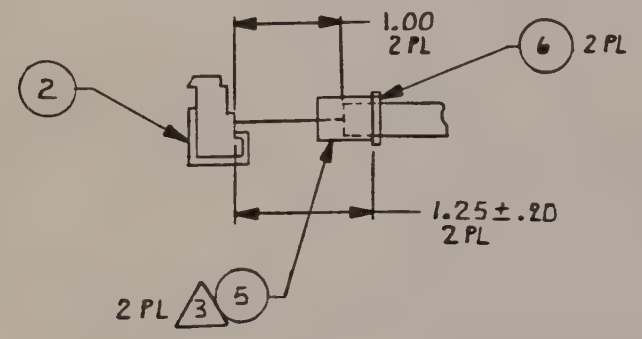
	ECO NO. 10746	ECO NO. 10810	ECO NO. 10828	ECO NO. 10871 - 872	ECO NO. 10907	ECO NO.
TOP ASSY - 327996	327996 A	327996 B	327996 B	327996C	327996D	
SUB-ASSY - 327989	→	→	→	→	→	
PWB - 309233A	309260	→	→	→	→	
U24 — 309652 U24 3E43	→	→	→	→	→	
U25 - 309653 U25 58EB	→	→	→	→	→	
U26 - 309654 U26 51BC	→	→	→	→	→	
U33 - 309655 U33 8AB1	→	→	→	→	→	
U38 - 309656 U38 B4E2	→	→	→	→	→	
U39 - 309657 U39 4EC7	→	→	→	→	→	
ITEM 3 { U22 - 309658 DOAA U22 / U36 - 309658 28F8 U36 }	ITEM 3 { U22 - 309672 EC66 U22 / U36 - 309672 B161 U36 }	ITEM 3 { U22 - 456966 EC66 U22 / U36 - 456966 C5B6 U36 }	ITEM 3 { U22 - 457002 F4C4 U22 / U36 - 457002 65B6 U36 }	ITEM 3 { U22 - 457019 F4C4 U22 / U36 - 457019 05DE U36 }	ITEM 3 { U22 - 457032 F4D2 U22 / U36 - 457032 11FC U36 }	
VER 2.2	VER 2.3	VER 2.4	→	VER 3.0	→	

Figure 5.11. Analog DTA PWB Assembly (A1/A2) (Sheet 2 of 2)

NOTES:

1. INSULATE EXPOSED DRAIN WIRE WITH ITEM 4.
2. ENSURE WIRES ARE COMPLETELY INSULATED WHEN CONNECTORS ARE BENT OVER AT 180° RADIUS.
3. ITEM 5 FERRITE BEAD MUST BE AS CLOSE TO CONNECTOR AS POSSIBLE AND COVER WITH HEAT SHRINK ITEM 3.
4. ENSURE SHIELDED STRANDS ARE TWISTED TIGHT BEFORE INSTALLING HEAT SHRINK.





ITEM OR FIND NO	QTY REQD	S-A STOCK NO	NOMENCLATURE OR DESCRIPTION	MATL SPEC AND SIZE OR COMPONENT VALUE	IDENTIFYING OR PART NO	FSCM NO
P2	1	176026	CONN, RECT 1 DC	3 CONTACT 24 AWG		
P1	1	176026	CONN, RECT 1 DC	3 CONTACT 24 AWG		
6	2	73045	TIE, CABLE			
5	2	85677	BEAD, FERRITE	.375 X .187 X .500		
4	.1	77551	TUBING, HEAT SHRINK	.063 DIA		
3	.3	77938	TUBING, HEAT SHRINK	.375 DIA		
2	2	174929	COVER	3 PIN .1 SP		
1	.63	315673	CABLE, SHIELDED	2 COND 24 AWG		

PARTS LIST

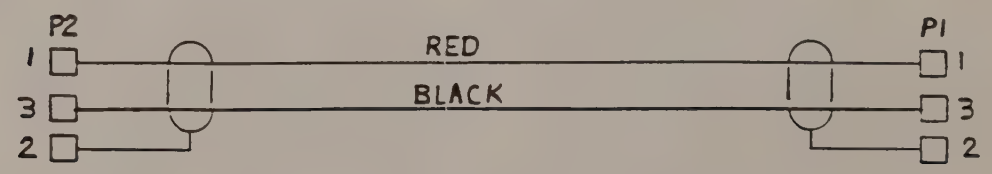
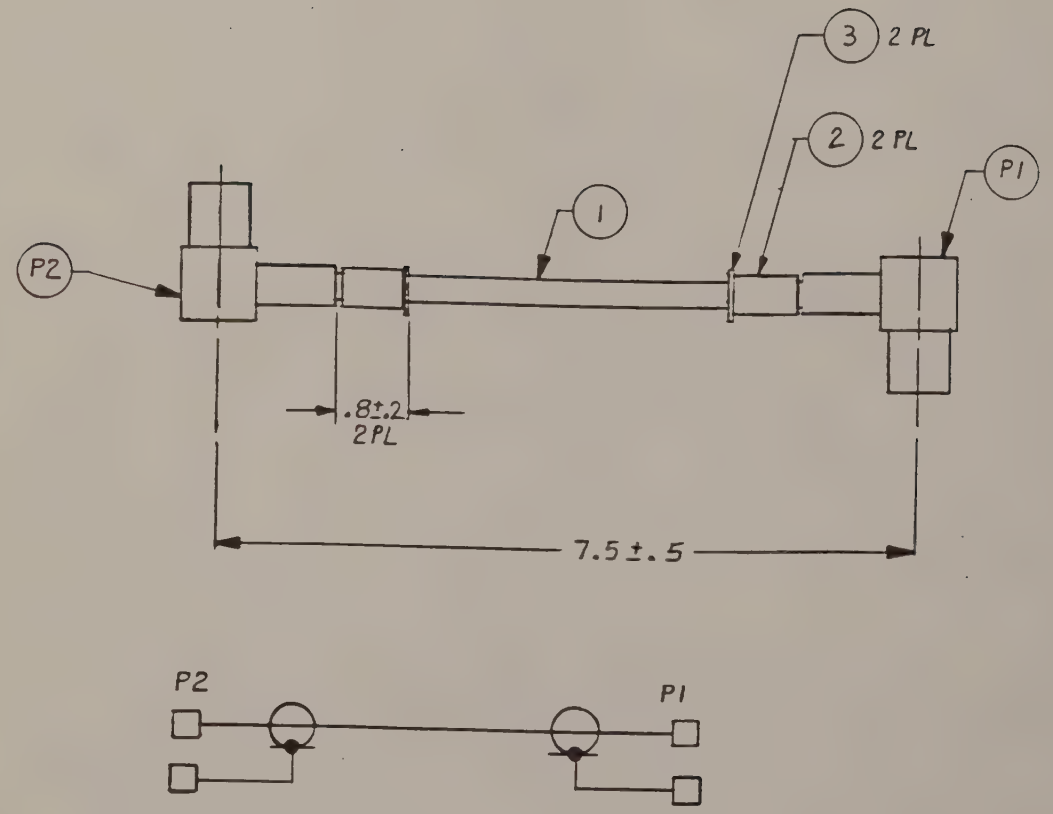


Figure 5.12. Analog/Demux Cable Assembly (A1/W2)



ITEM OR FIND NO	QTY REQD	S-A STOCK NO	NOMENCLATURE OR DESCRIPTION	MATL SPEC AND SIZE OR COMPONENT VALUE	IDENTIFYING OR PART NO	FSCM NO
P2	1	84938	CONN, COAX	75 OHMS SMB		
P1	1	84938	CONN, COAX	75 OHMS SMB		
3	2	73045	TIES, CABLE			
2	2	85677	BEAD, FERRITE	.375 X .187 X.500		
1	.63	83156	CABLE, COAX	75 OHMS		

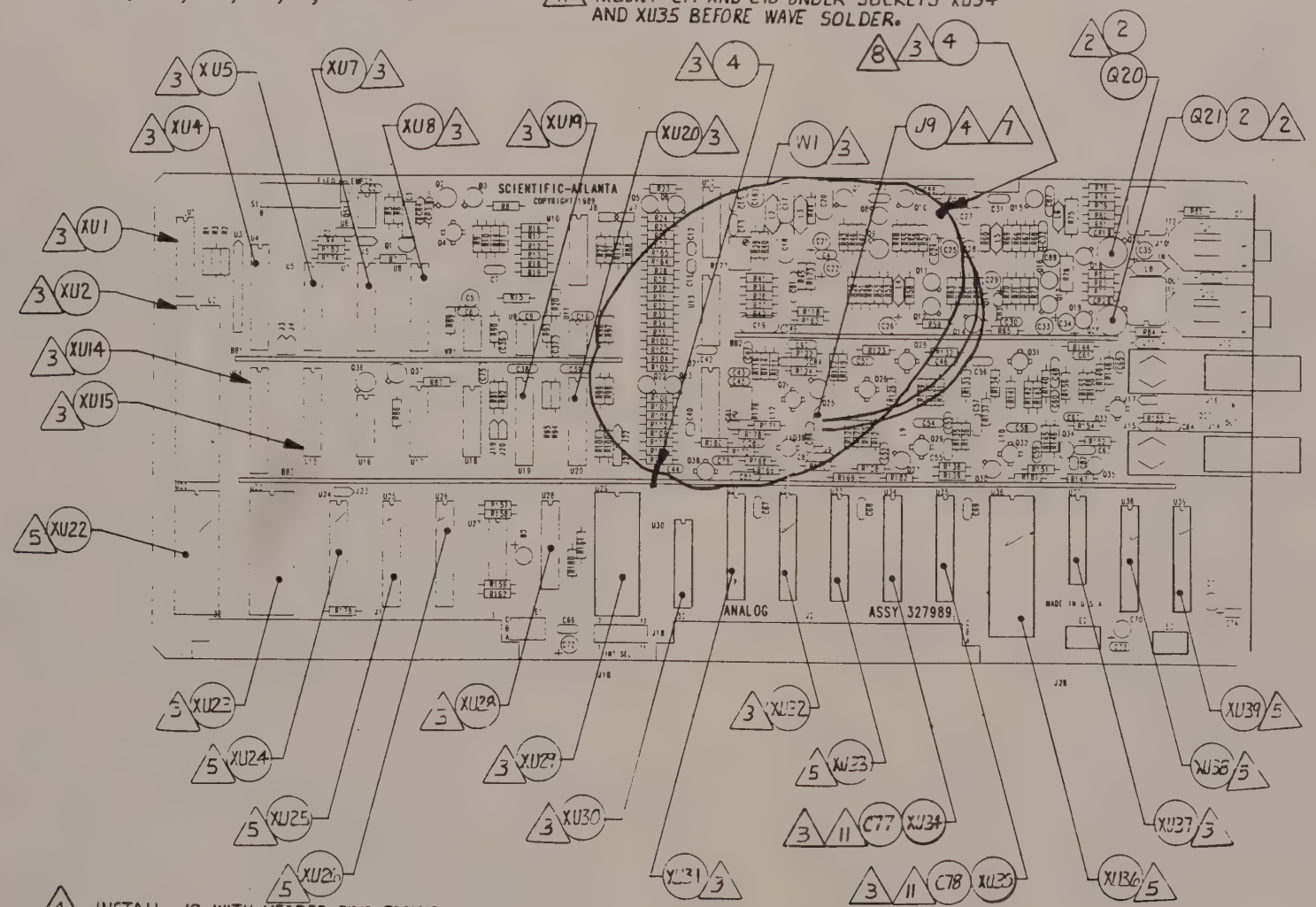
PARTS LIST

Figure 5.13. Analog/Demux Cable Assembly (A1/W3)

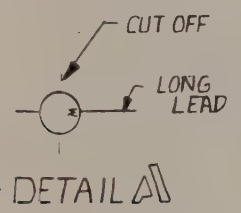
456953
351052Z

NOTES:

1. MASK ALL TRIANGULAR HOLES TO PREVENT FILLING WITH SOLDER. (13 PLACES)
2. PLACE ITEM 2 UNDER Q20 AND Q21 BEFORE WAVE SOLDER.
3. INSTALL AFTER WAVE SOLDER: U1, U2, U4, U5, U7, U8, U14, U15, U19, U20, U23, U28, U29, U30, U31, U32, U34, U37, W1, AND ITEM 4.
9. REMOVED
10. REMOVED
11. MOUNT C77 AND C78 UNDER SOCKETS XU34 AND XU35 BEFORE WAVE SOLDER.

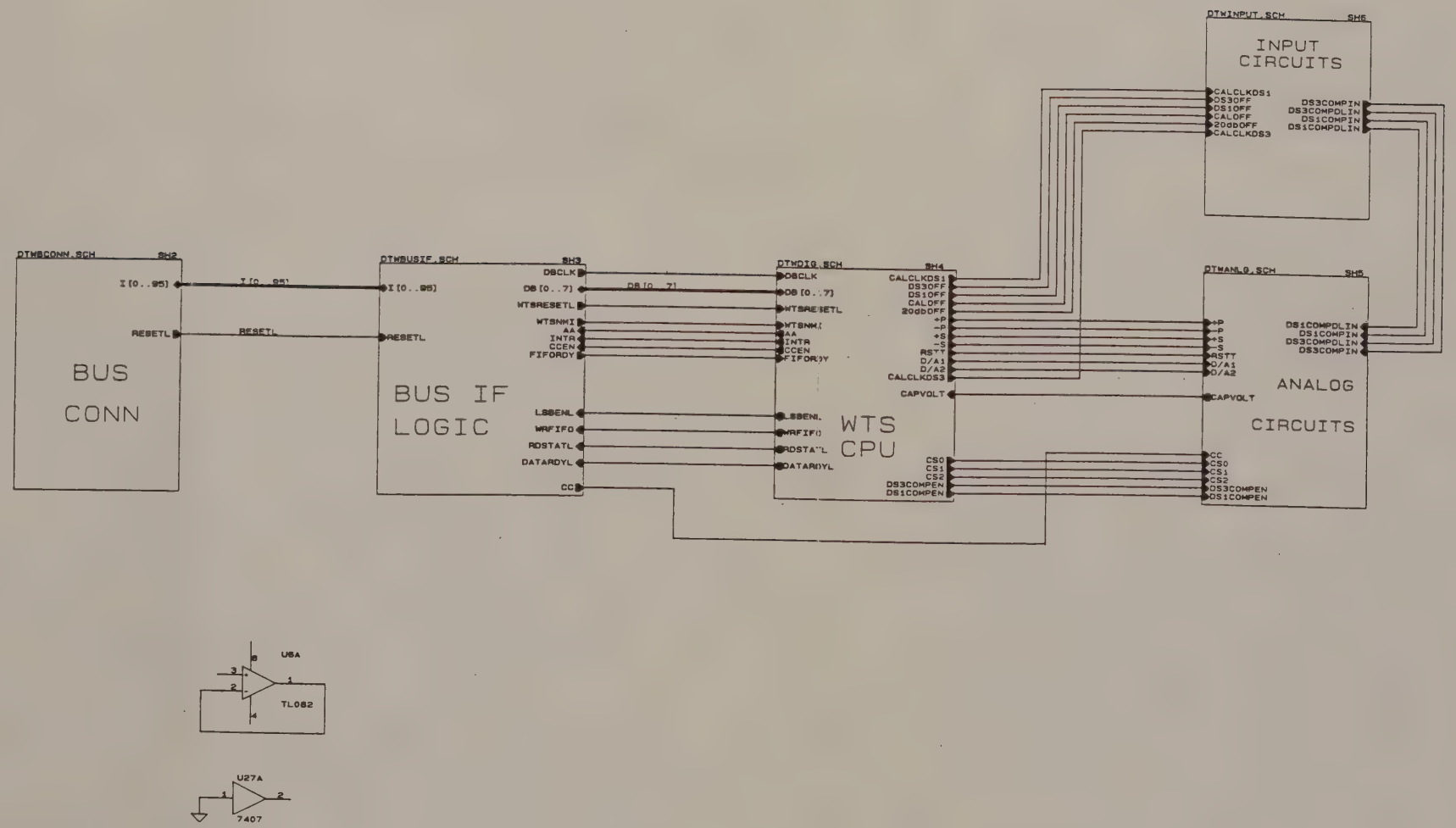


4. INSTALL J9 WITH HEADER PINS FACING TOWARD L9
5. INSTALLED ON NEXT ASSY: U22, U24, U25, U26, U33, U36, U38, AND U39.
6. CUT OFF I LEAD OF Q38 AND Q39 BEFORE INSTALLING IN PWB. SEE DETAIL "A"
7. BEFORE INSTALLING W1 BEND PINS OF J9 HEADER APPROXIMATELY .2 IN. FROM PWB SO W1 CAN BE EASILY PLUGGED ONTO HEADER.
8. USING ITEM 4 SECURE W1 LOOSELY TO PWB.



DETAIL A

Figure 5.14. Analog DTA PWB Subassembly (A1/A2/A1)



327987
351052Z

Figure 5.15. Analog DTA PWB Subassembly Schematic (A1/A2/A1) (Sheet 1 of 6)

BUS CONNECTORS

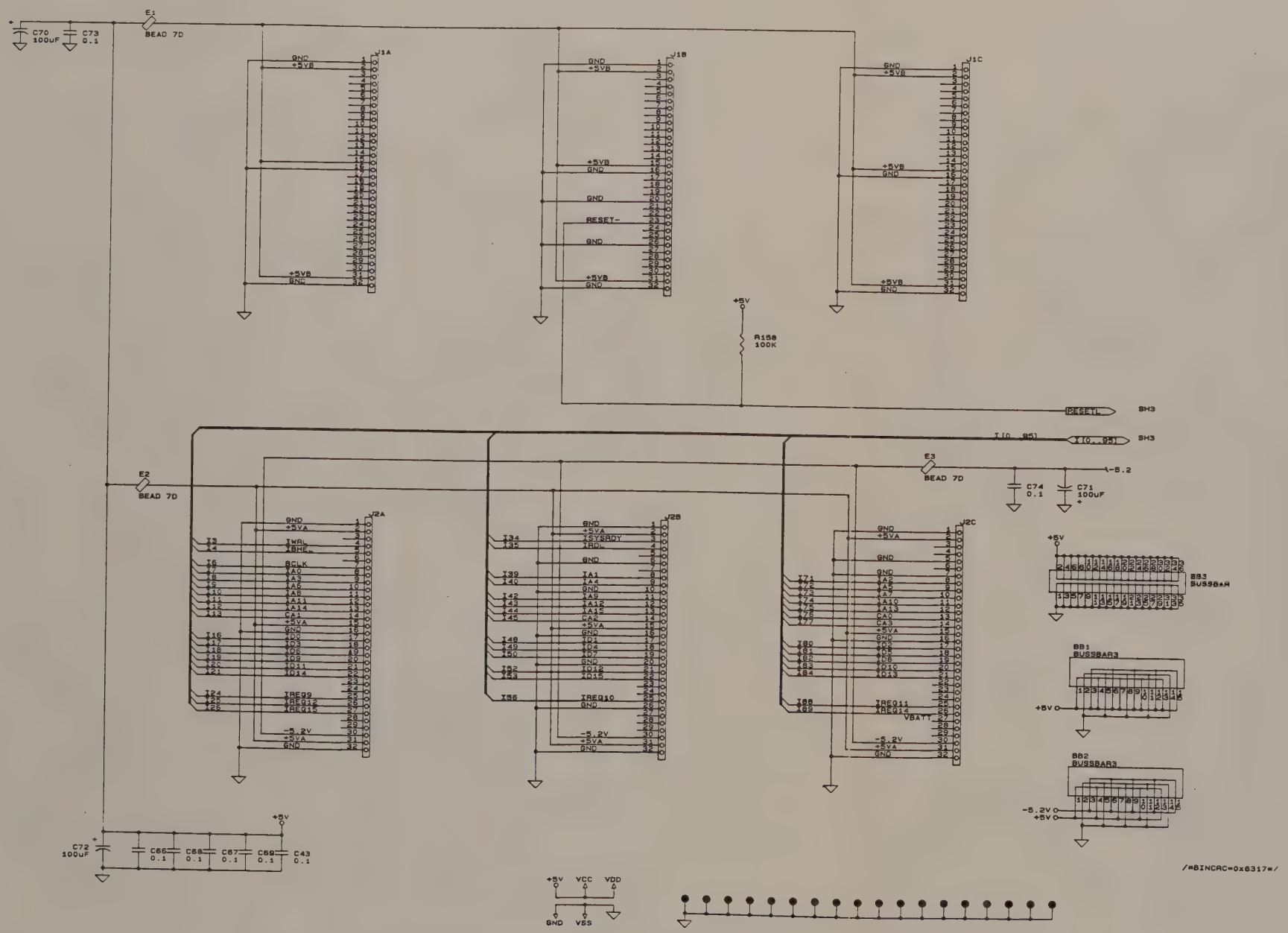
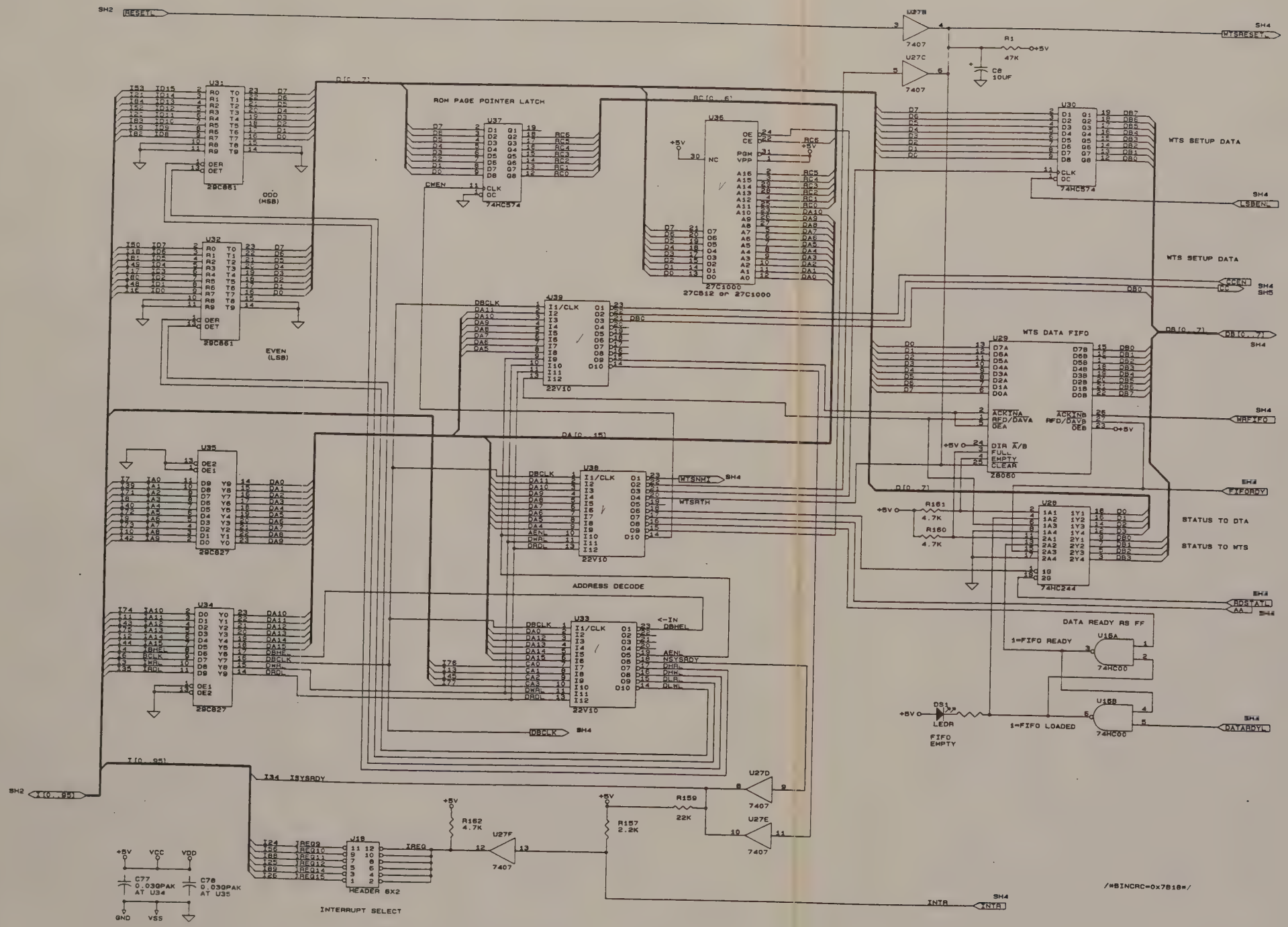


Figure 5.15. Analog DTA PWB Subassembly Schematic (A1/A2/A1) (Sheet 2 of 6)



ANALOG PWB BUS INTERFACE LOGIC

Figure 5.15. **Analog DTA PWB Subassembly Schematic (A1/A2/A1) (Sheet 3 of 6)**

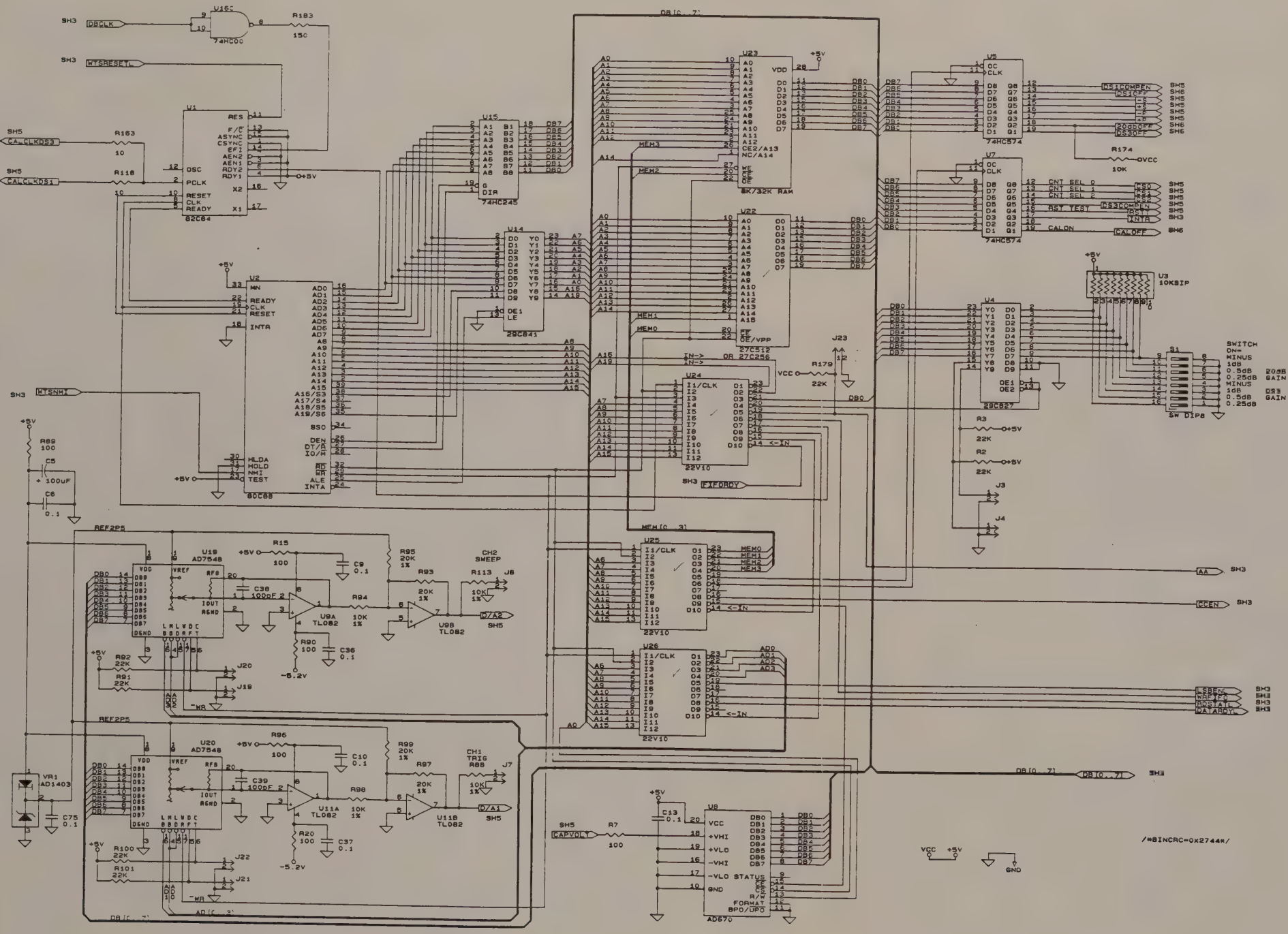


Figure 5.15. **Analog DTA PWB Subassembly Schematic (A1/A2/A1) (Sheet 4 of 6)**

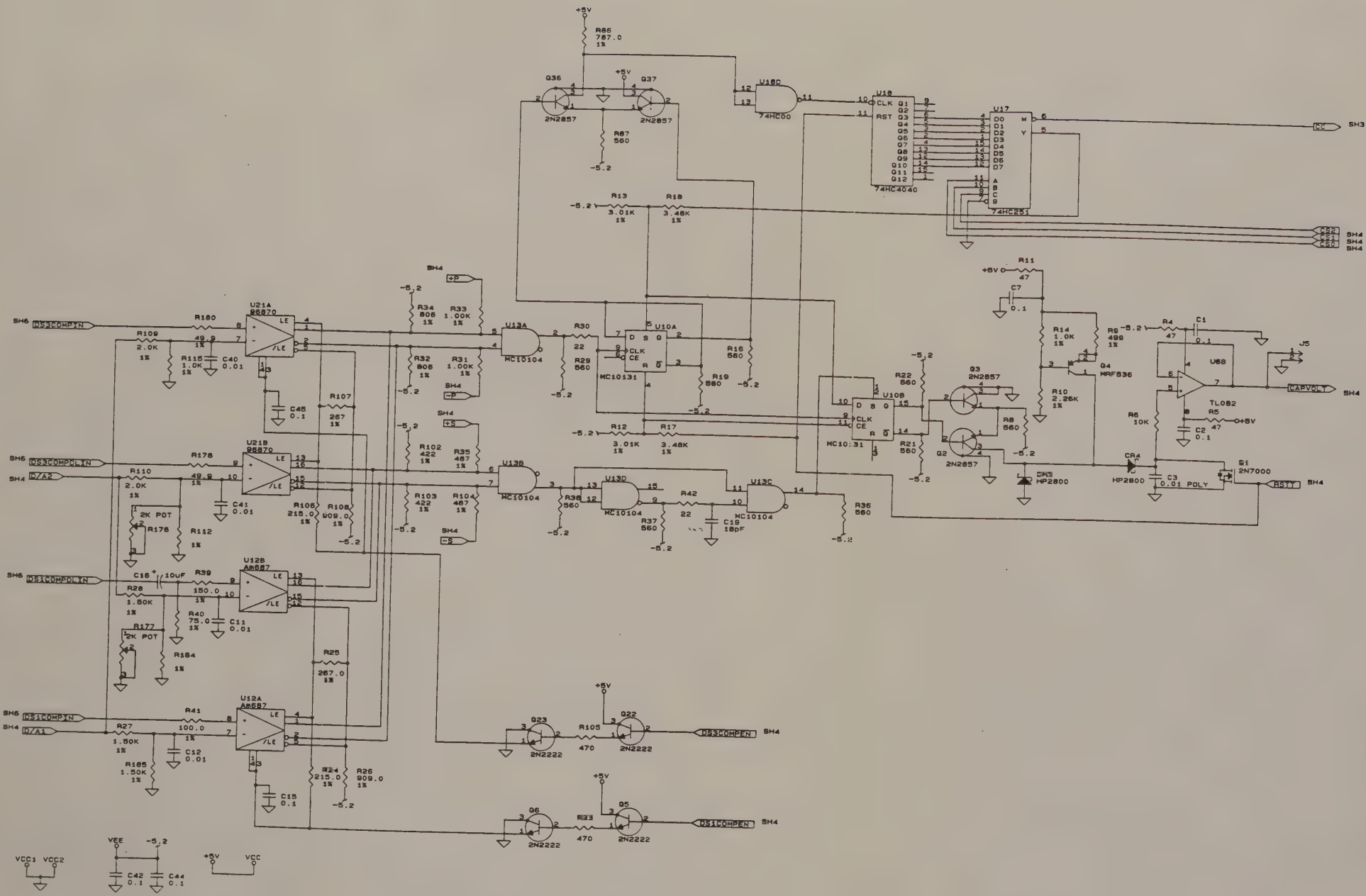


Figure 5.15. **Analog DTA PWB Subassembly Schematic (A1/A2/A1) (Sheet 5 of 6)**

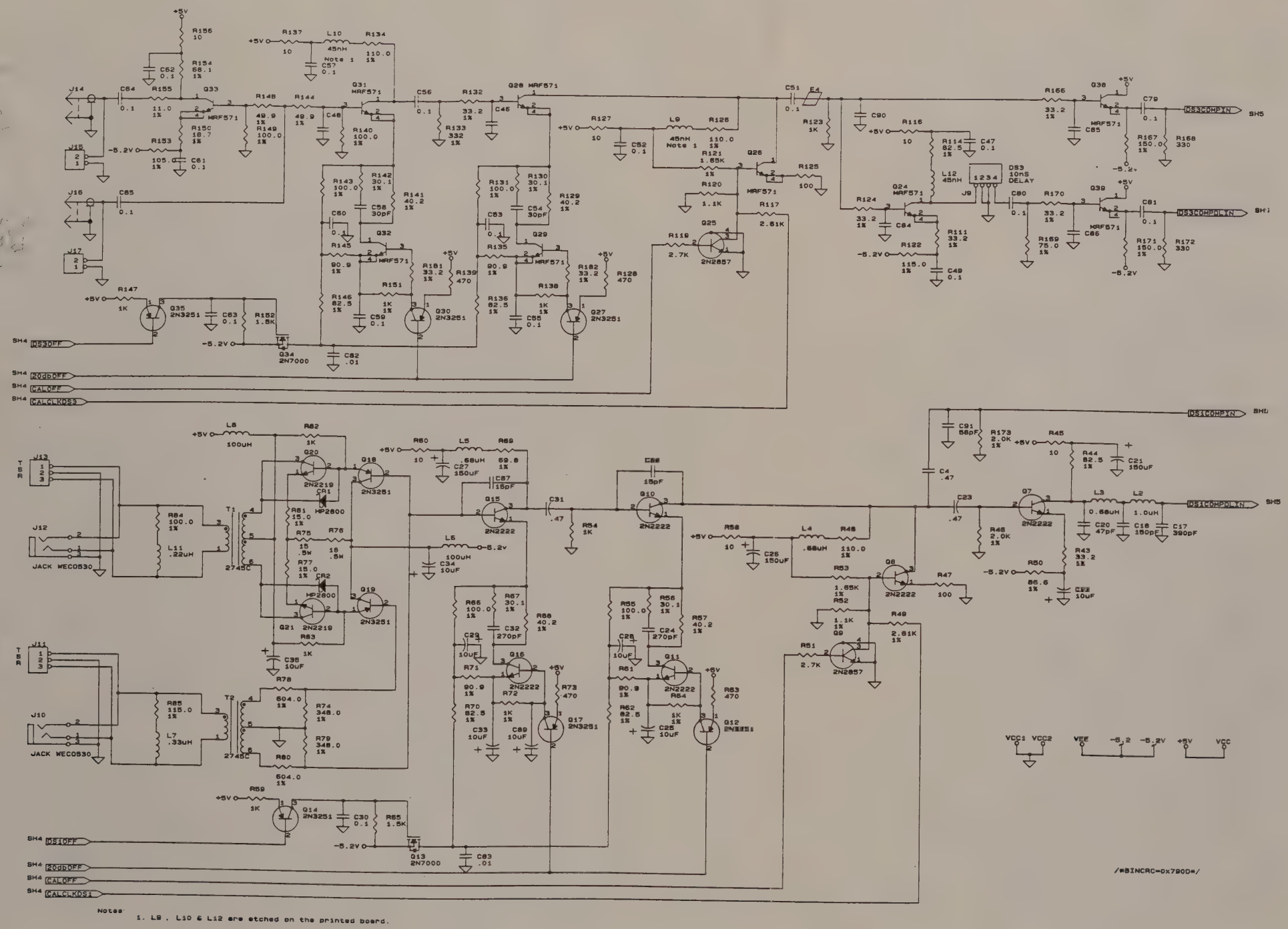
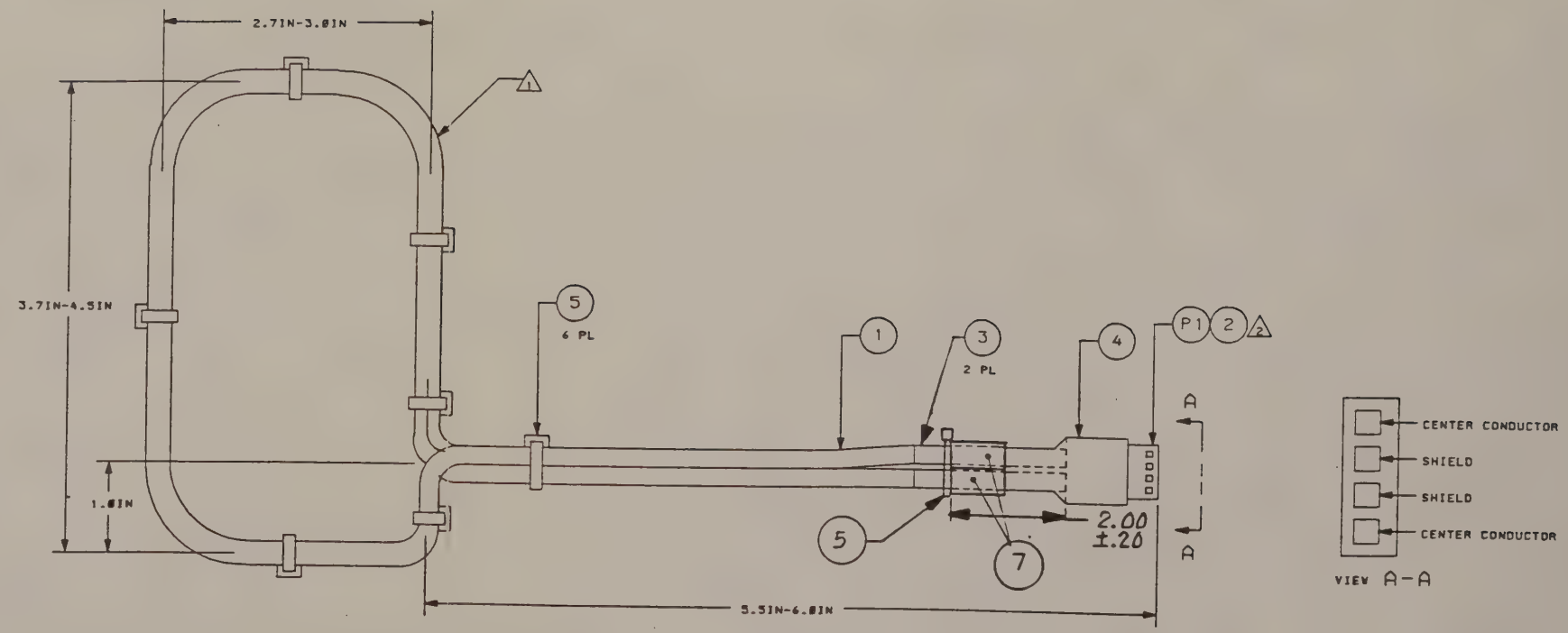


Figure 5.15. Analog DTA PWB Subassembly Schematic (A1/A2/A1) (Sheet 6 of 6)



ITEM	QTY	SA STK NO.	DESCRIPTION	SPEC AND SIZE OR VALVE	IDENTIFYING NO.
7	2	81977	CORE BEAD	ID .260 X .125X .375L	
6	.20 FT	73385	WIRE, STRANDED	22 AWG, BLACK	
5	7	73845	CABLE TIE	MINIATURE 4IN LONG	
4	.30 FT	75930	HEATSHRINK TUBING	.50 TO .250	
3	.30 FT	75929	HEATSHRINK TUBING	.125 TO .062	
2	4	82955	CONN CONTACT	22-26 AWG	
1	7FT	73835	CABLE, COAX	75 OHM MIN 0.116 OD	
P1	1	89639	CONN BODY W/O INSERTS	4 HOLES BEC	

PARTS LIST

NOTES:

1. CUT CABLE ITEM 1 7FT, TERMINATE ENDS PER DETAIL "B", FORM LOOP WITH 6 TURNS, INSTALL CABLE TIES AS SHOWN.
2. CENTER CONDUCTOR MUST BE DOUBLED BACK. DIELECTRIC INSULATION MUST BE COMPLETELY CRIMPED. SEE DETAIL "B".

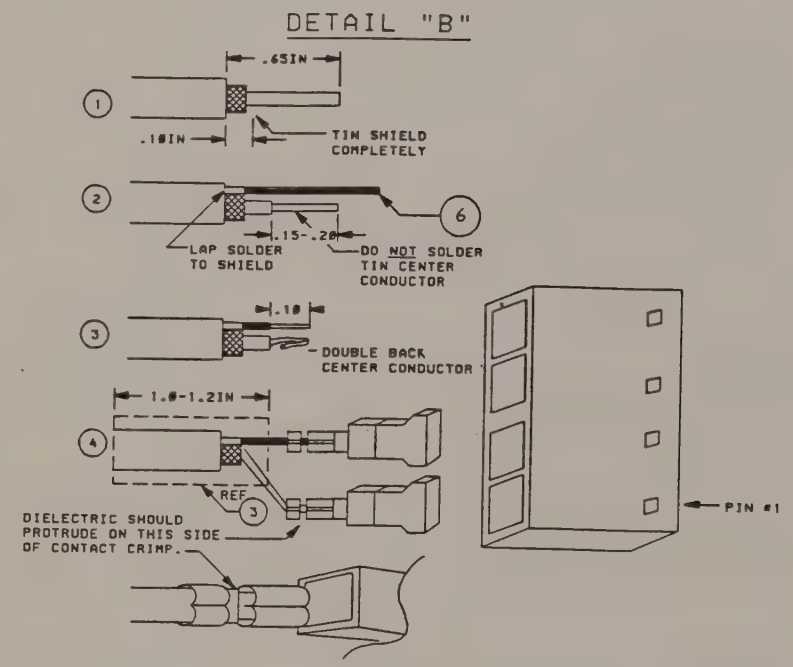


Figure 5.16. Delay Line 75 Ohm 10ns (A1/A2/W1)

309274
351052Z

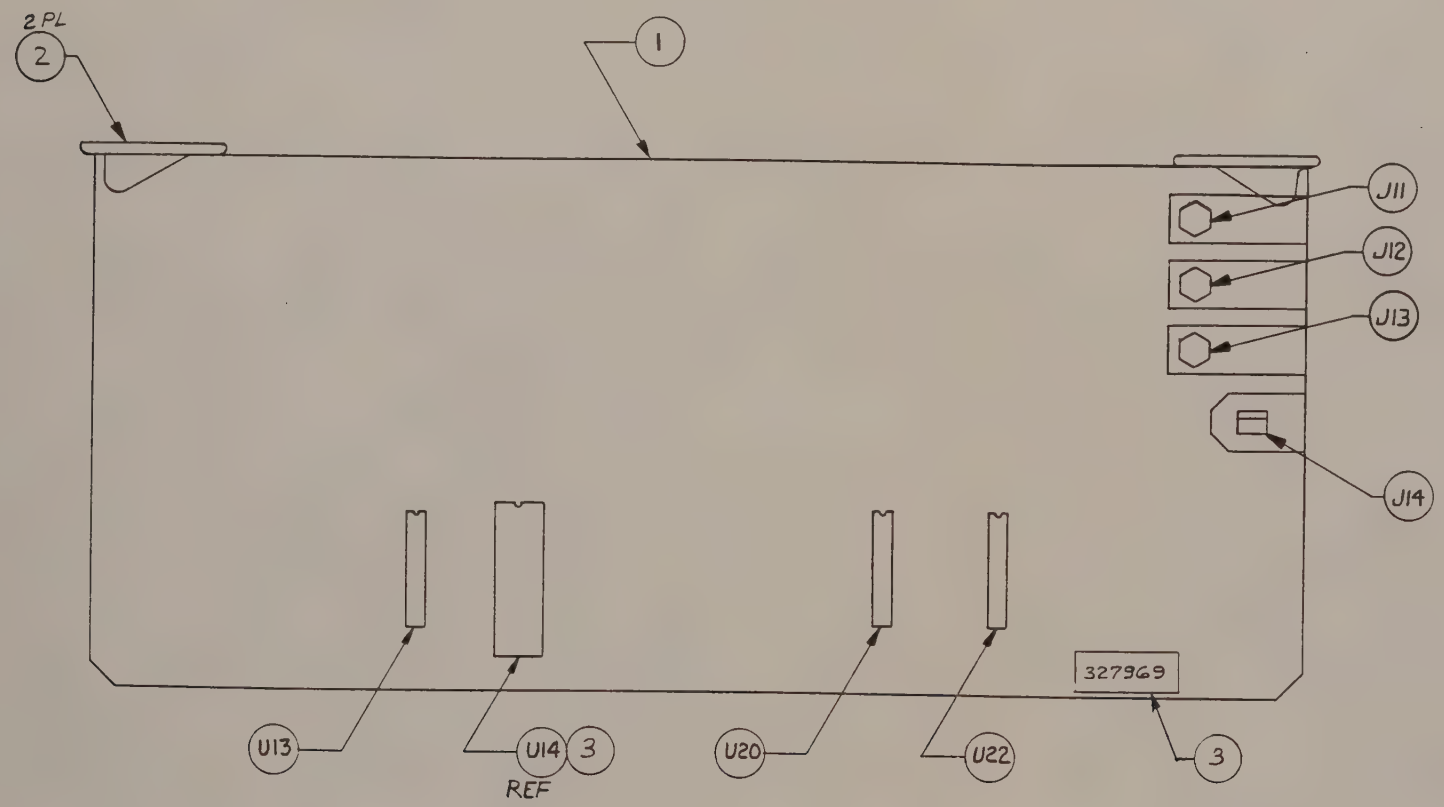
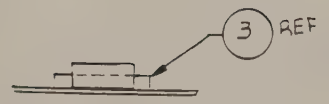
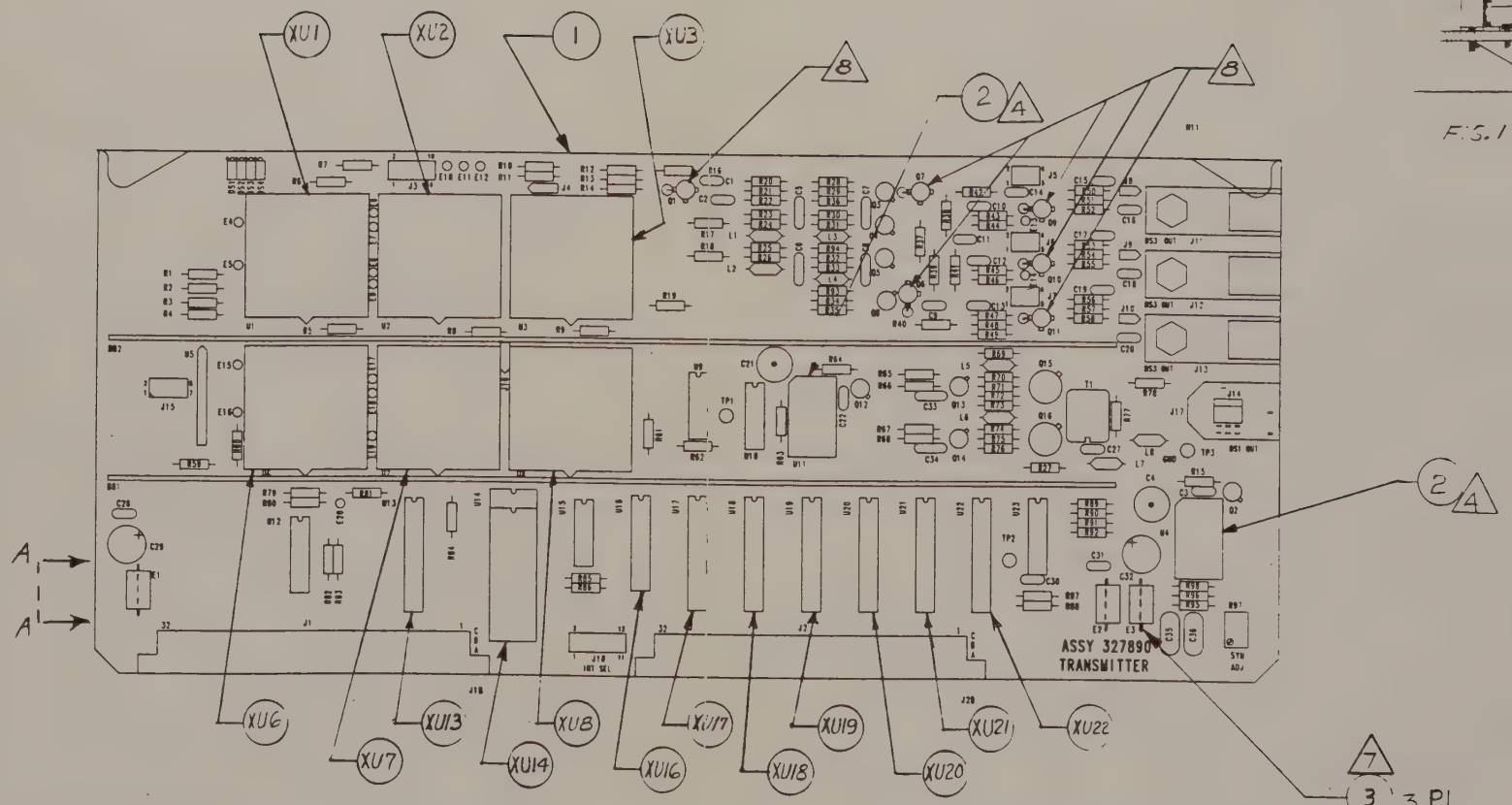


Figure 5.17. DS1/DS3 Transmitter PWB Assembly (A1/A3)



VIEW A-A
SCALE: NONE



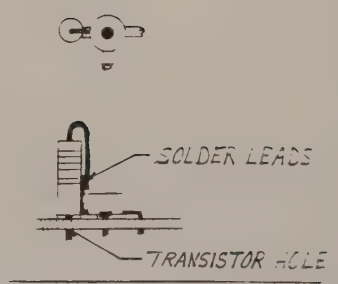
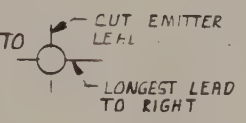


FIG. 1 (5)

NOTES:

1. INSTALL XU1, XU2, XU3, XU6, XU7, XU8, XU13, XU14, XU16, XU17, XU18, XU19, XU20, XU21, AND XU22 *BEFORE* WAVE SOLDER.
2. INSTALL U1, U2, U3, U6, U7, U8, U16, U17, U18, U19, 20, AND U21 AFTER WAVE SOLDER.
3. INSTALL U13, U14, U20, AND U22 AT NEXT ASSY.
4. INSTALL ITEM 2 BEFORE AND UNDER U4 AND U11.
5. PARTS MAY BE SHOWN BUT NOT USED CHECK PARTS LIST FOR CLARIFICATION.
6. ON ITEMS Q1 Q6 Q7 Q9 Q10 Q11, WITH LONG LEAD TO RIGHT, CUT TOP EMITTER LEAD OFF.
7. FOR ITEMS E1, E2, E3, SEE VIEW A-A.



(8) ADD RESISTOR AS SHOWN IN FIG. 1. (R99-R104)

MODIFICATIONS FOR 327889 B

9. CUT RUN FROM U1-27 TO U2-27.
10. CUT RUN FROM U2-27 TO U9-2.
11. CUT RUN FROM U6-27 TO U7-27.
12. CUT RUN FROM U7-27 TO U9-5.
13. ADD WIRE FROM U1-27 TO U9-2.
14. ADD WIRE FROM U9-3 TO FEED THRU HOLE BESIDE U9-2. (FEED THRU CONNECTS TO U2-27).
15. ADD WIRE FROM U6-27 TO U9-5.
16. ADD WIRE FROM U9-6 TO U7-27.

Figure 5.18. DS1/DS3 Transmitter PWB Subassembly (A1/A3/A1)

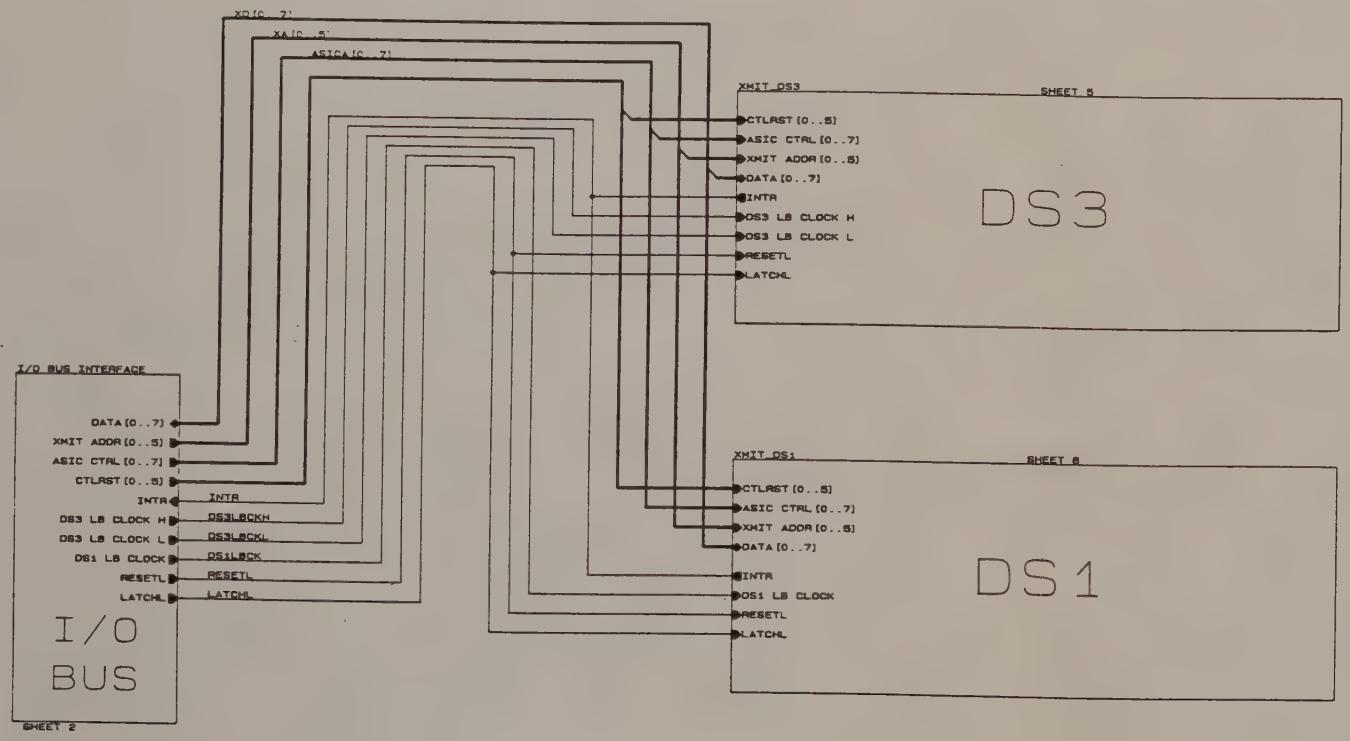


Figure 5.19. **DS1/DS3 Transmitter PWB Subassembly Schematic (A1/A3/A1) (Sheet 1 of 10)**

TXMIT BUS

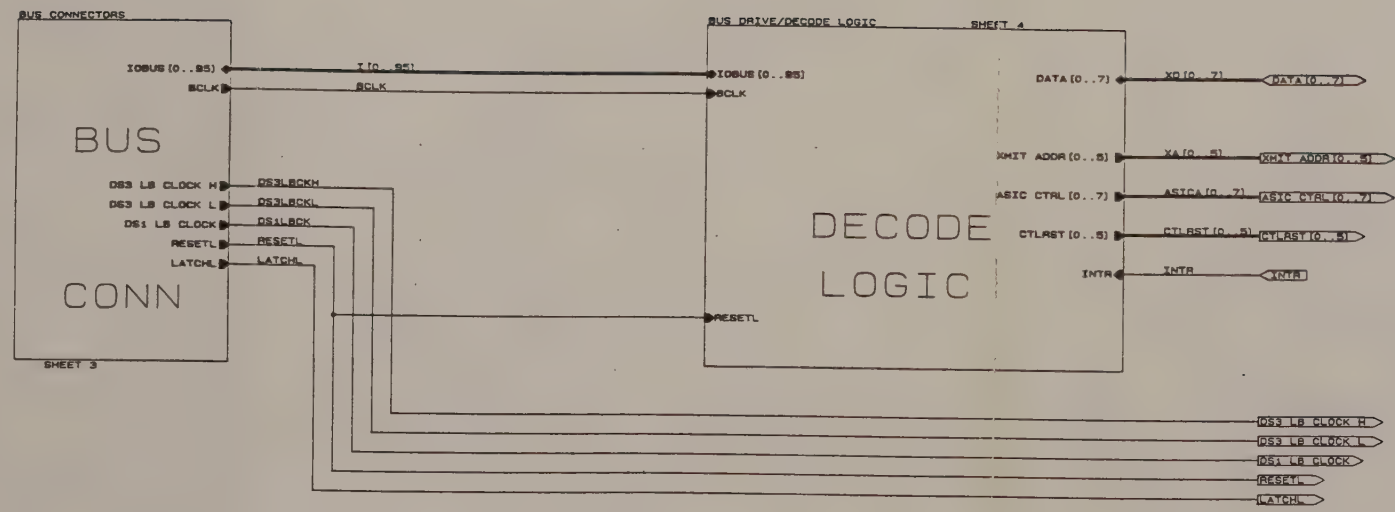


Figure 5.19. DS1/DS3 Transmitter PWB Subassembly Schematic (A1/A3/A1) (Sheet 2 of 10)

BUS CONNECTORS

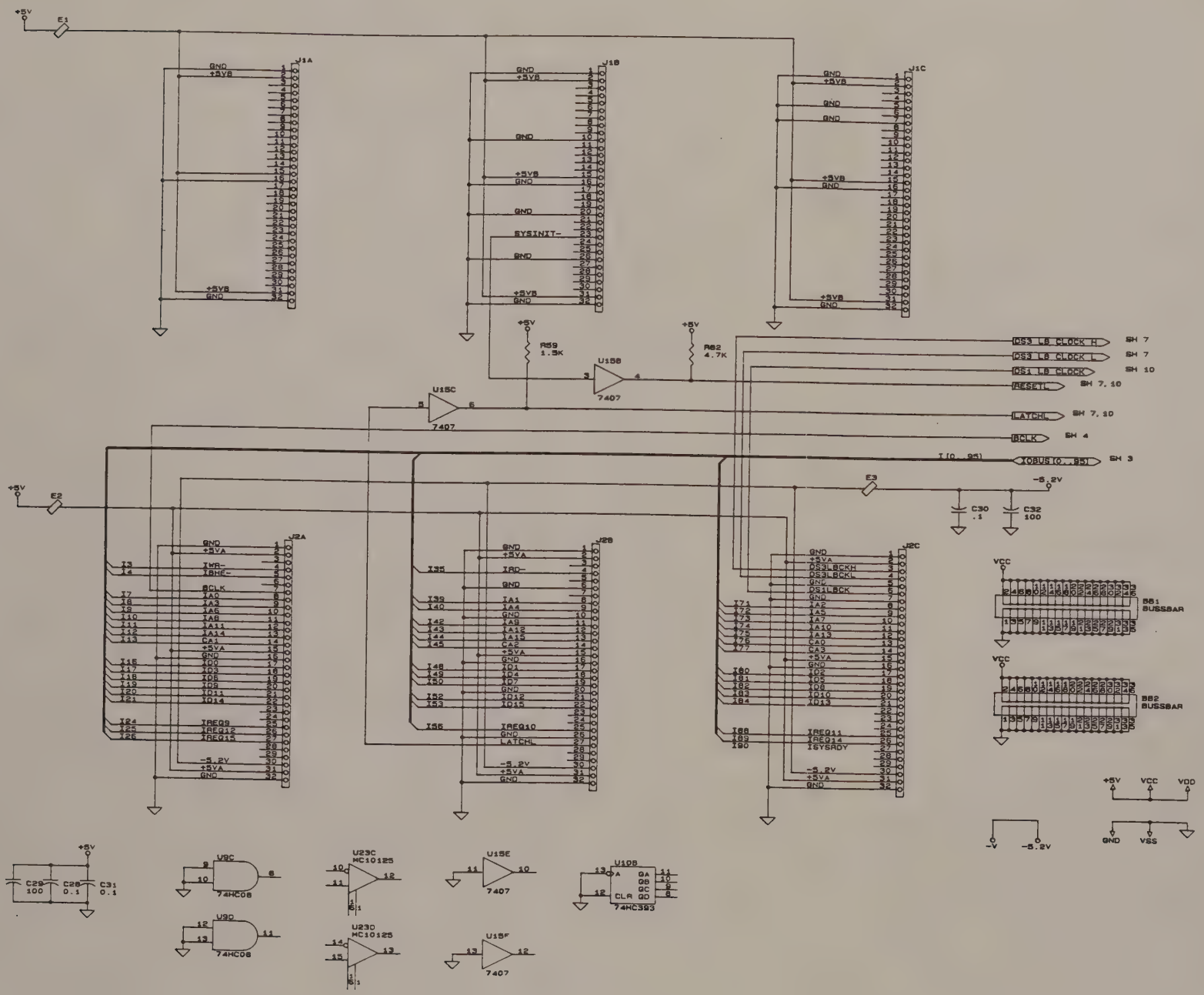


Figure 5.19. DS1/DS3 Transmitter PWB Subassembly Schematic (A1/A3/A1) (Sheet 3 of 10)

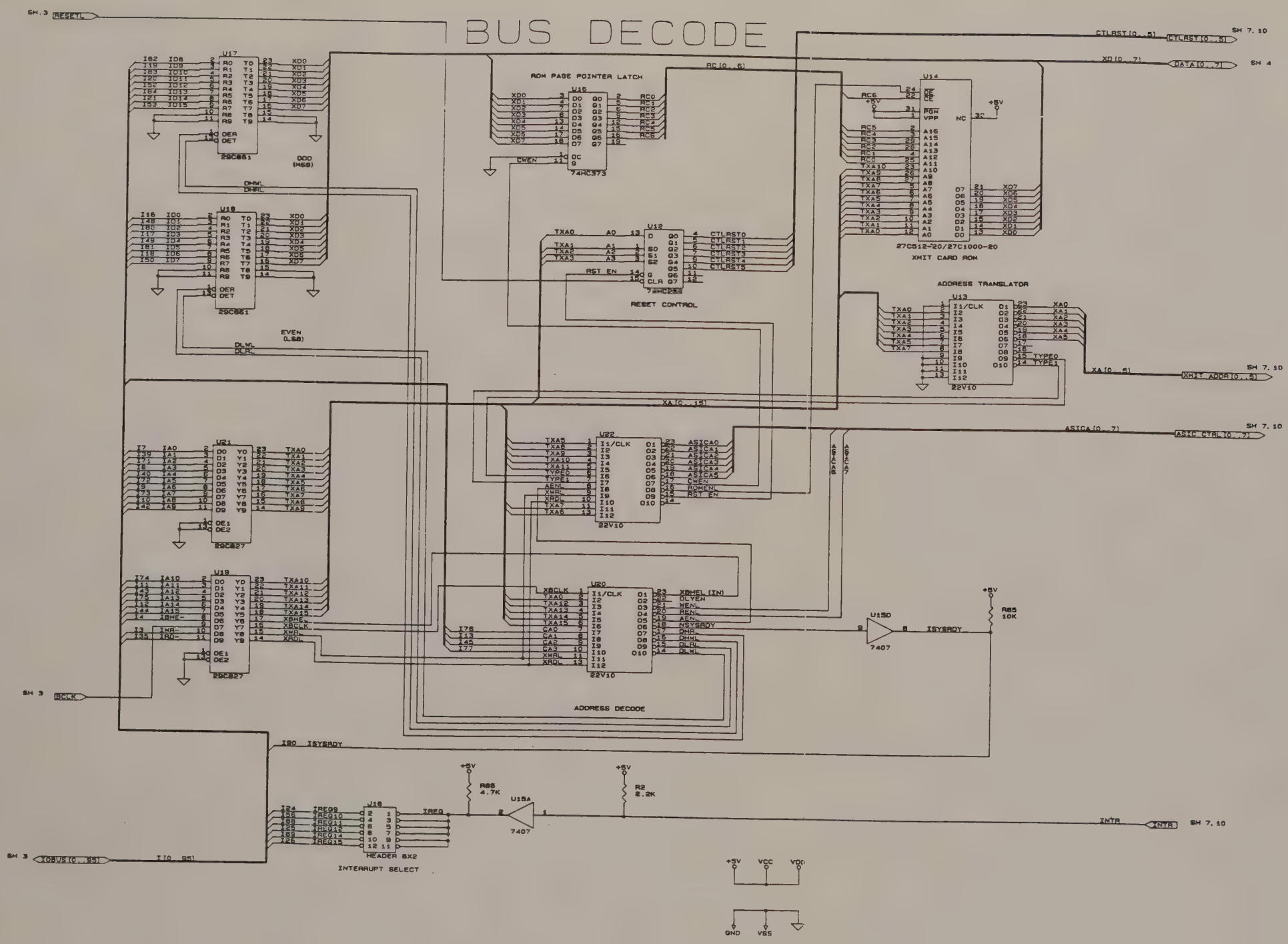


Figure 5.19. DS1/DS3 Transmitter PWB Subassembly Schematic (A1/A3/A1) (Sheet 4 of 10)

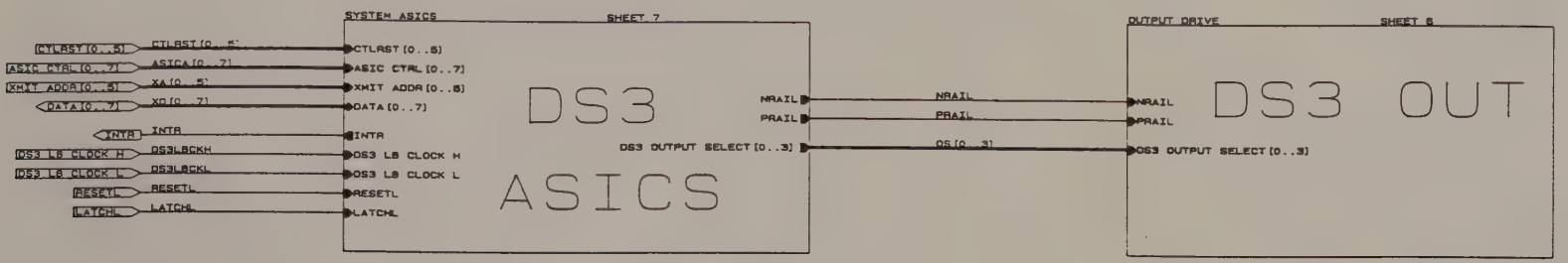
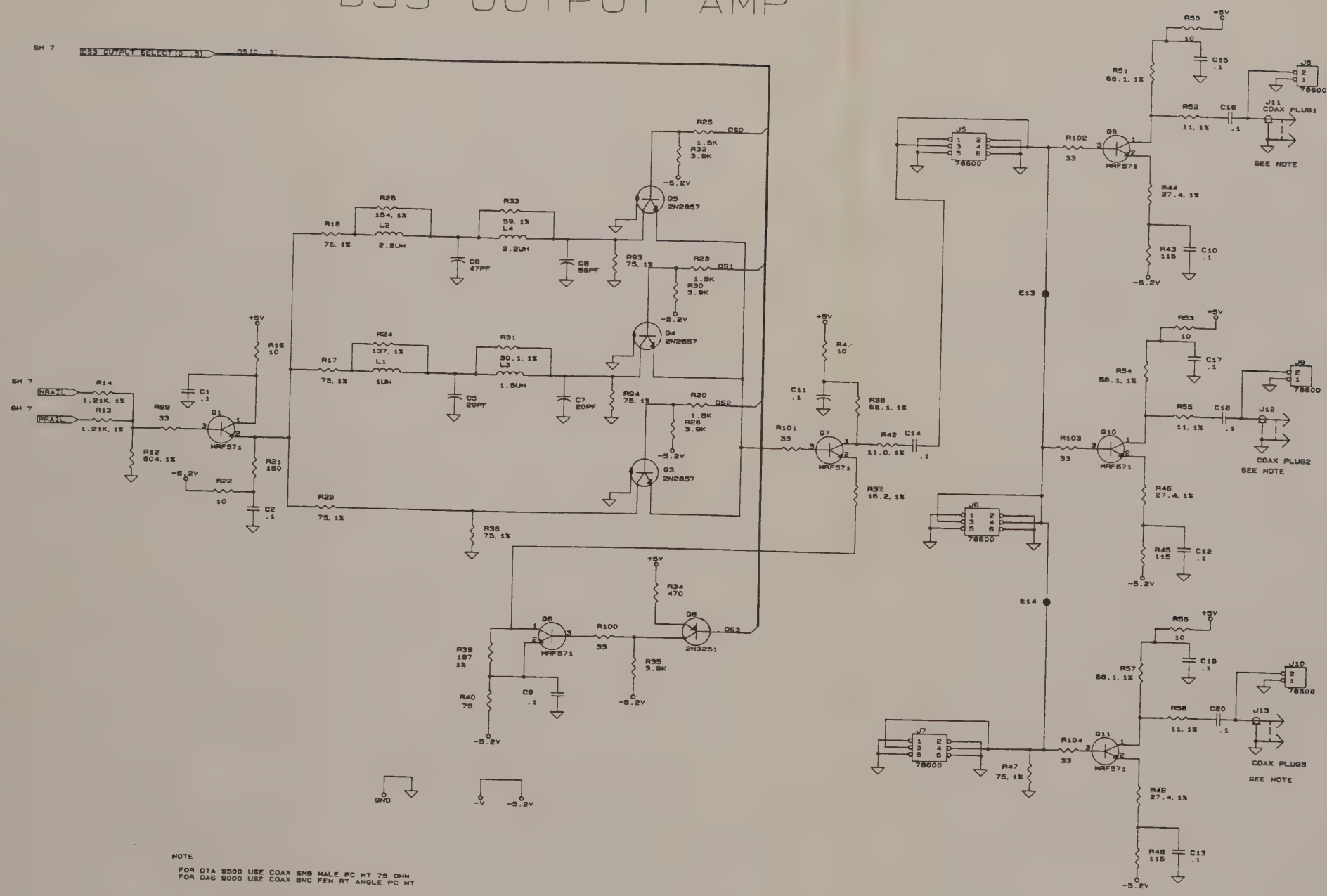


Figure 5.19. DS1/DS3 Transmitter PWB Subassembly Schematic (A1/A3/A1) (Sheet 5 of 10)

DS3 OUTPUT AMP



NOTE

FOR DTA 9500 USE COAX SMB MALE PC MT 75 OHM
FOR DAS 9000 USE COAX BNC FEM RT ANGLE PC MT.

Figure 5.19. **DS1/DS3 Transmitter PWB Subassembly Schematic (A1/A3/A1) (Sheet 6 of 10)**

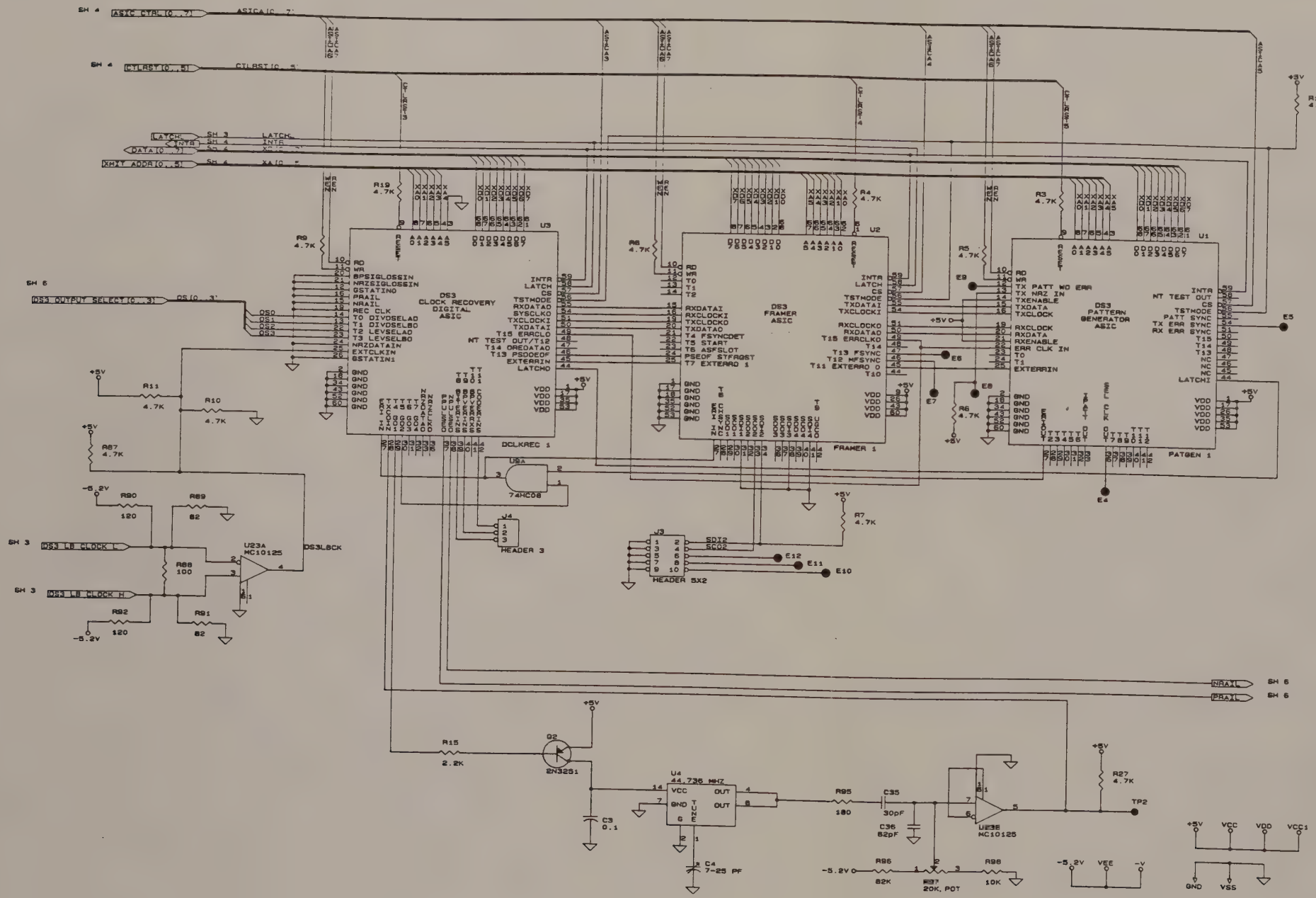


Figure 5.19. DS1/DS3 Transmitter PWB Subassembly Schematic (A1/A3/A1) (Sheet 7 of 10)

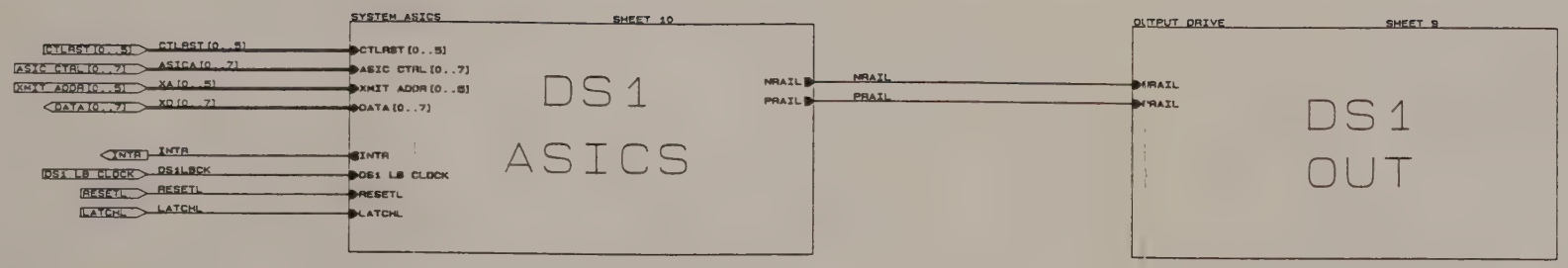
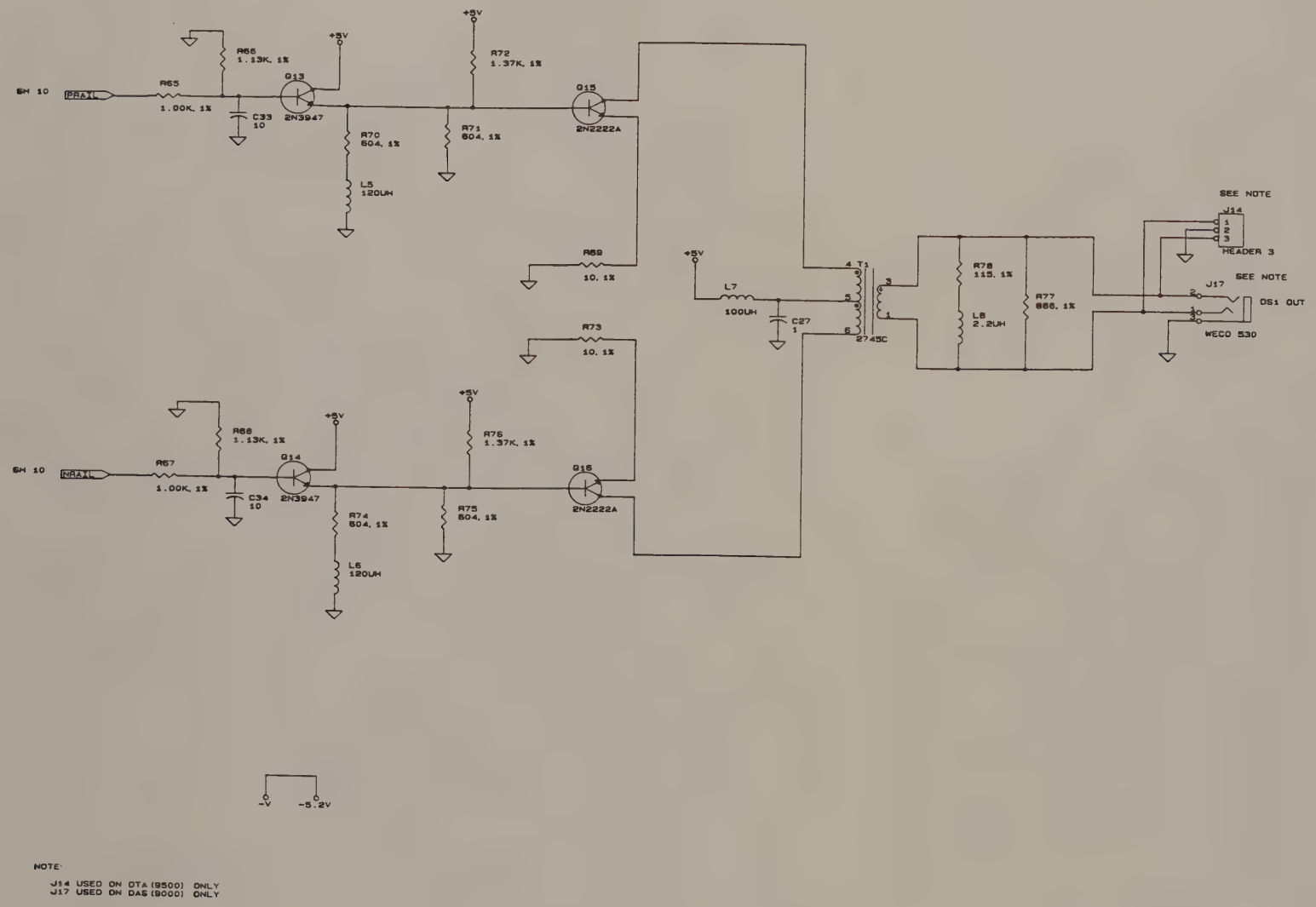


Figure 5.19. **DS1/DS3 Transmitter PWB Subassembly Schematic (A1/A3/A1) (Sheet 8 of 10)**

DS1 OUTPUT AMP



NOTE:
J14 USED ON DTA (9500) ONLY
J17 USED ON DAS (9000) ONLY

Figure 5.19. DS1/DS3 Transmitter PWB Subassembly Schematic (A1/A3/A1) (Sheet 9 of 10)

327888C
351052Z

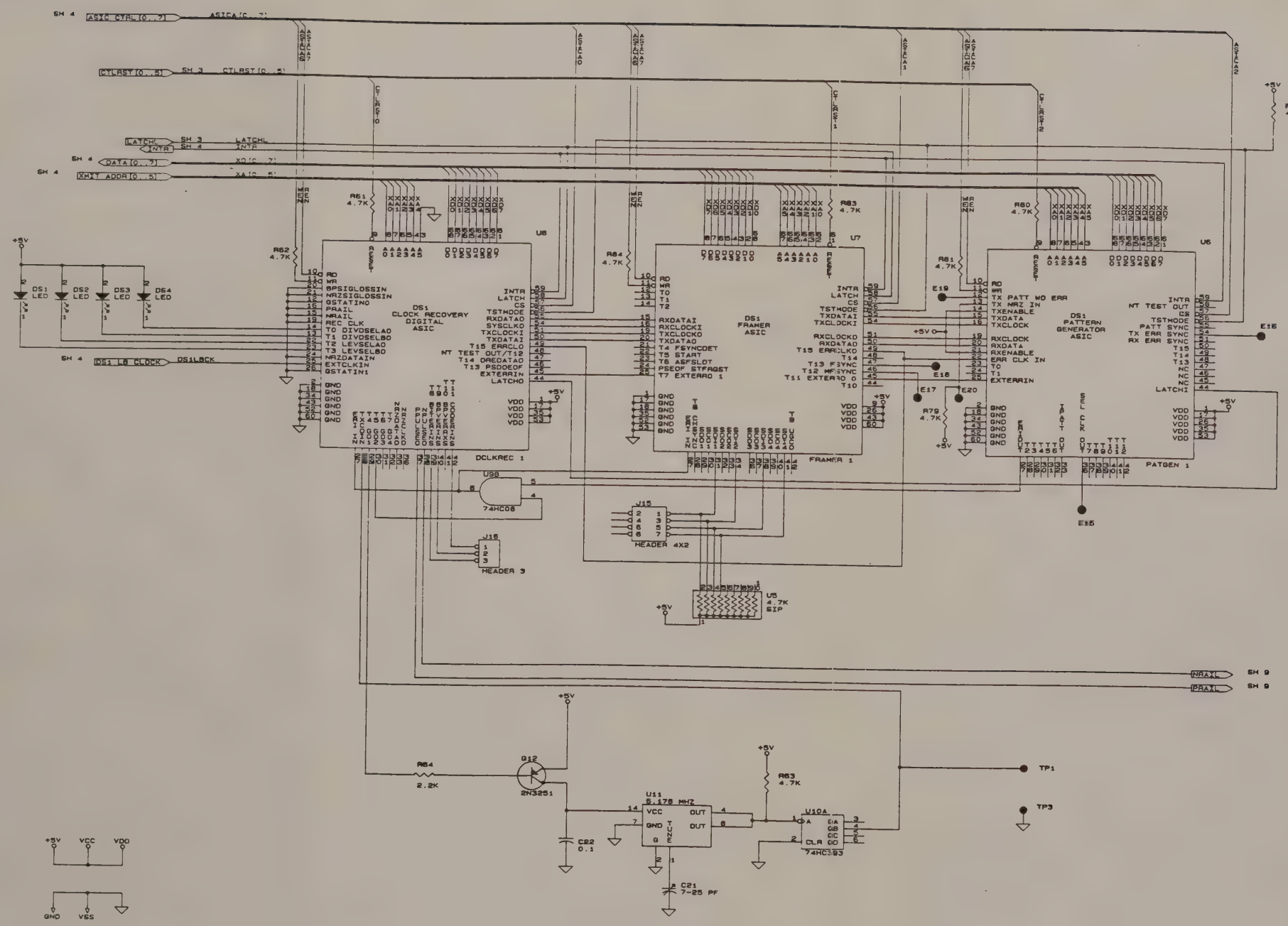


Figure 5.19. DS1/DS3 Transmitter PWB Subassembly Schematic (A1/A3/A1) (Sheet 10 of 10)

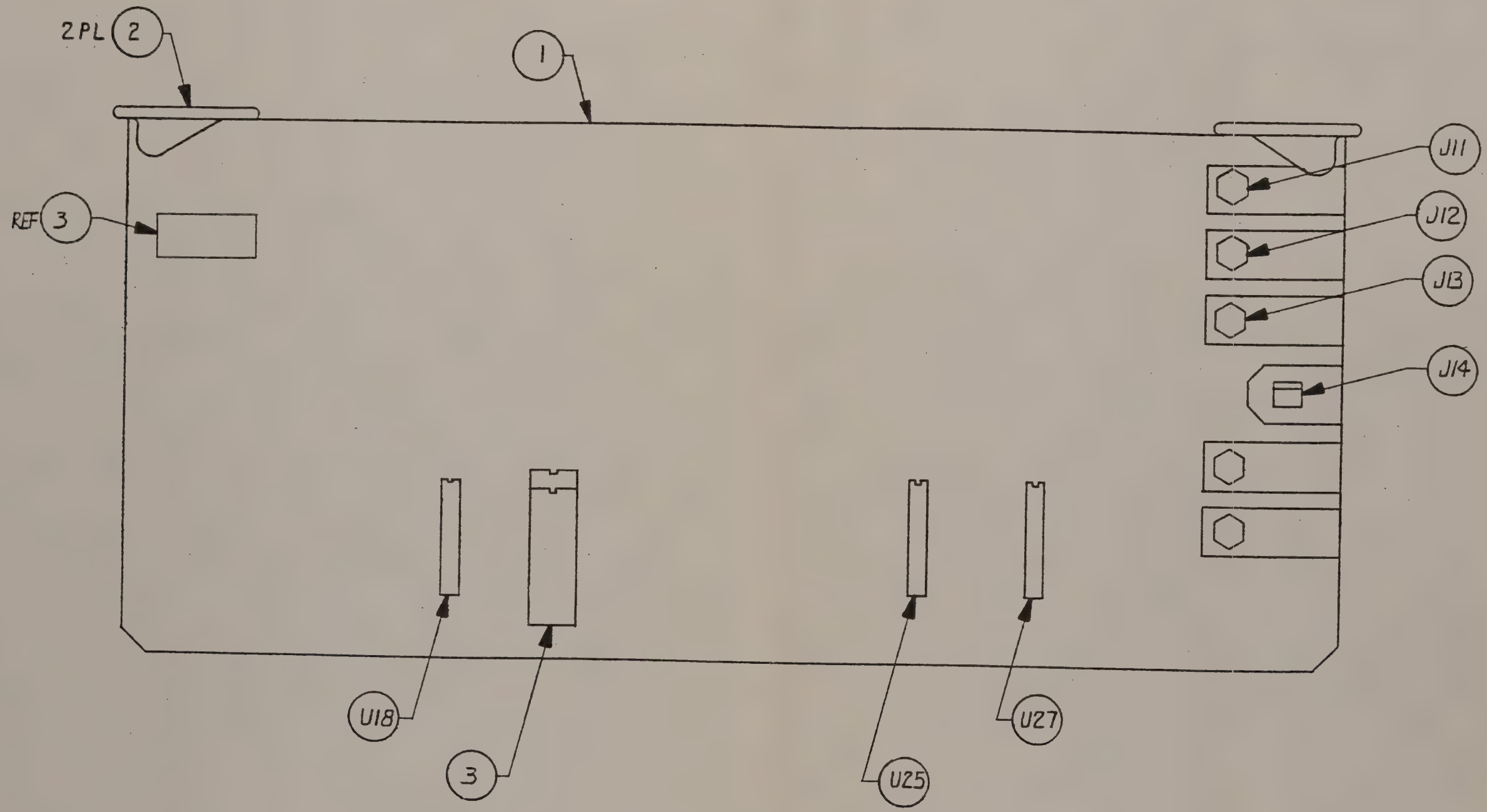


Figure 5.20. Transmitter PWB Assembly (A1/A3)

309123C
351052Z

NOTES:

1. MOUNT ITEM 2 UNDER U1 AND U8 BEFORE WAVE SOLDER.
2. MASK ALL TRIANGLE HOLES TO PREVENT FILLING WITH SOLDER. (21 PLACES)
3. INSTALL AFTER WAVE SOLDER U4, U5, U6, U12, U13, U14, U21, U22, U23, U24, U26.
4. SOLDER C5 AND C21 ON BACKSIDE OF PWB.
5. ORIENT J22 J23 AS SHOWN ON DRAWING.
6. INSTALL ON NEXT ASSEMBLY: U18, U19, U25, U27.

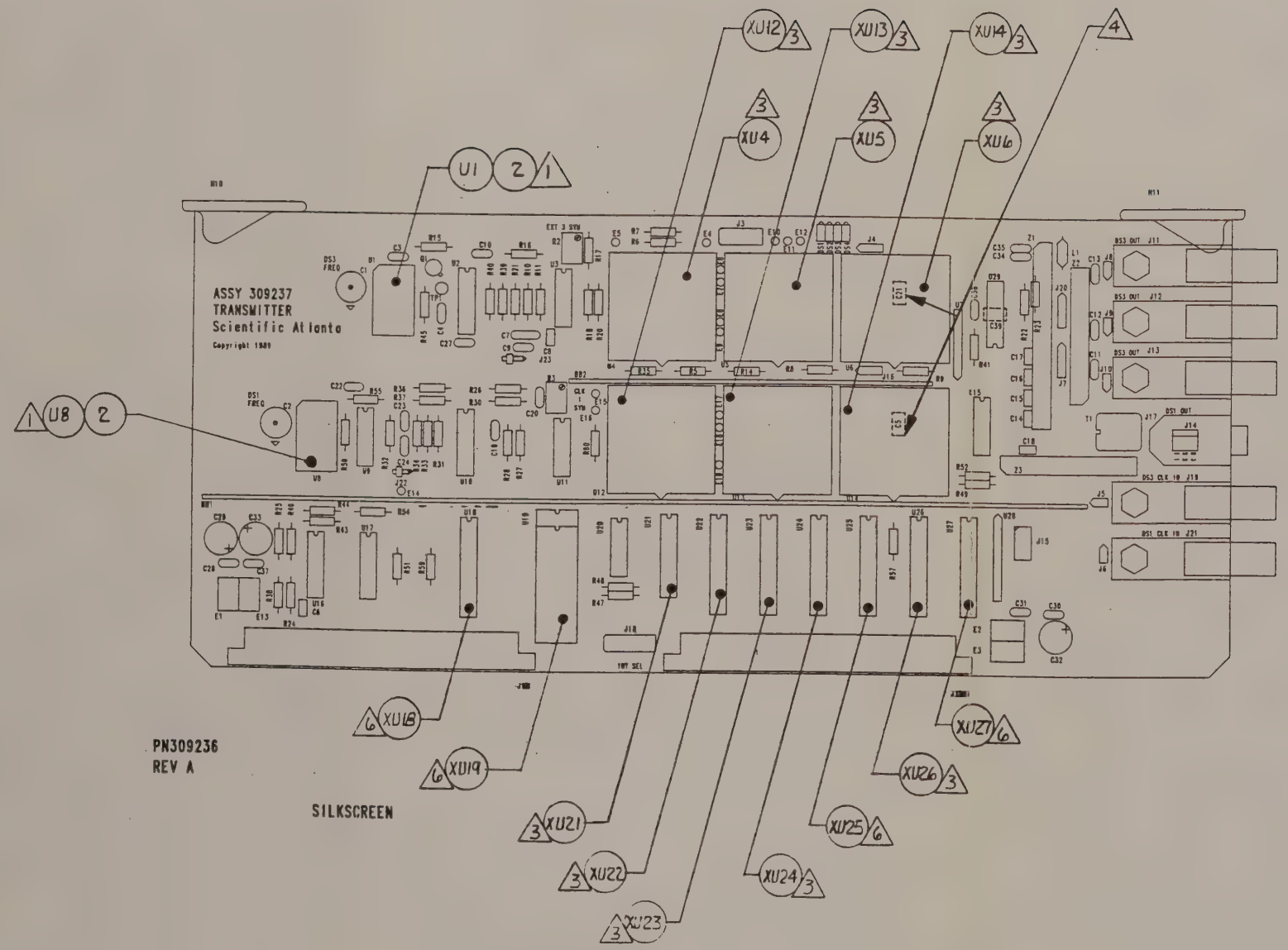


Figure 5.21. Transmitter PWB Subassembly (A1/A3/A1)

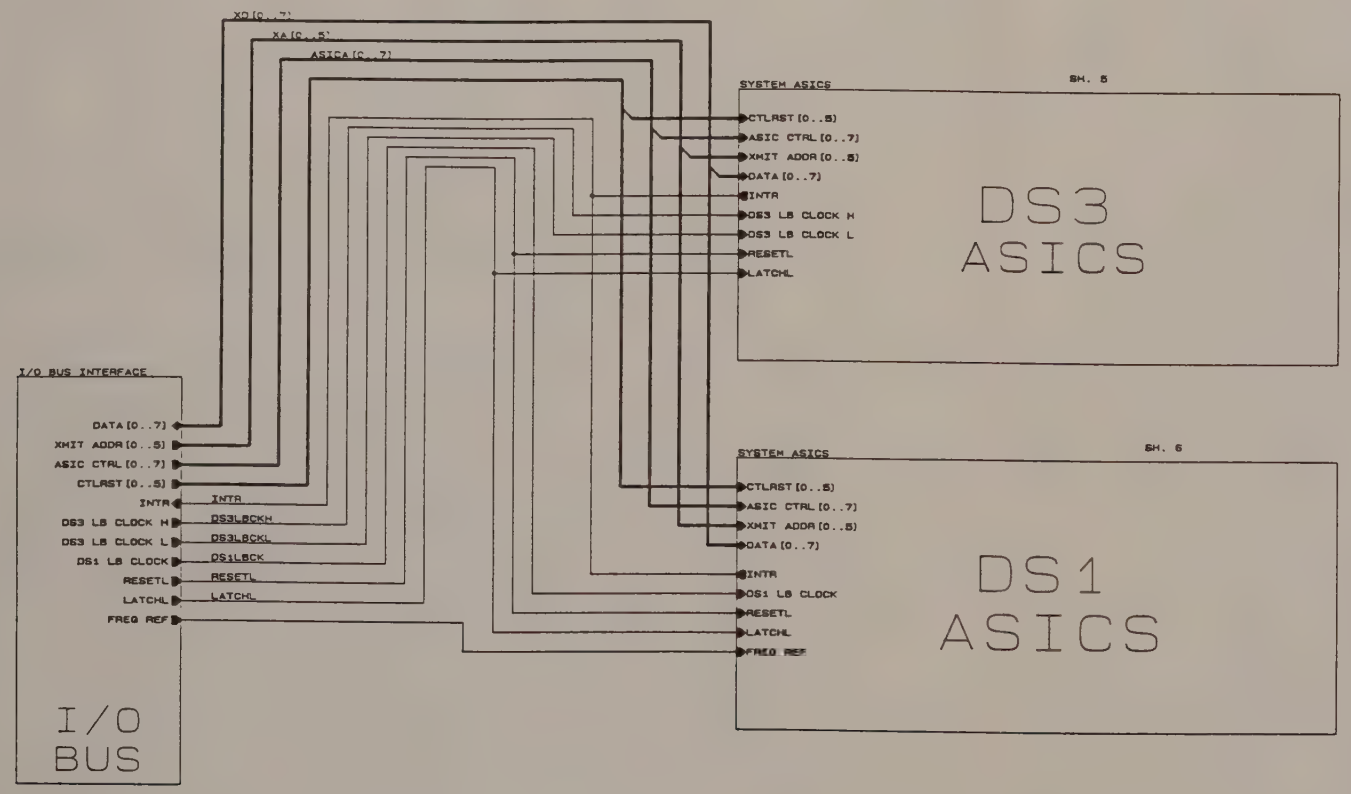


Figure 5.22. Transmitter PWB Subassembly Schematic (A1/A3/A1) (Sheet 1 of 6)

309235C
351052Z

TXMIT BUS

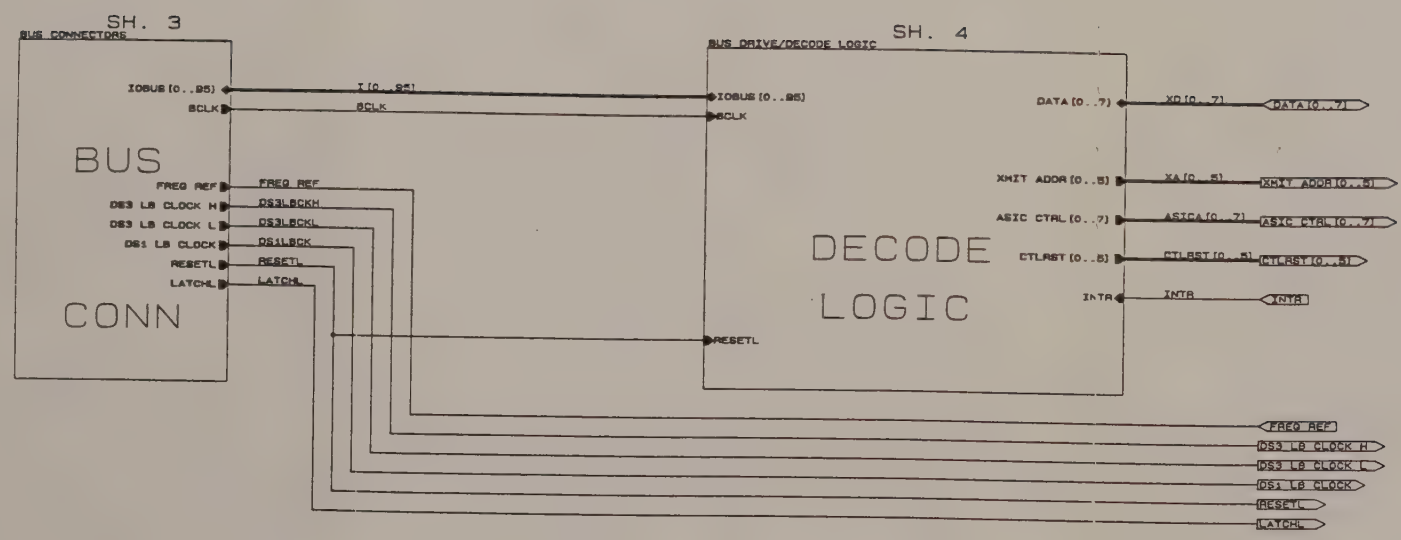


Figure 5.22. **Transmitter PWB Subassembly Schematic (A1/A3/A1) (Sheet 2 of 6)**

BUS CONNECTORS

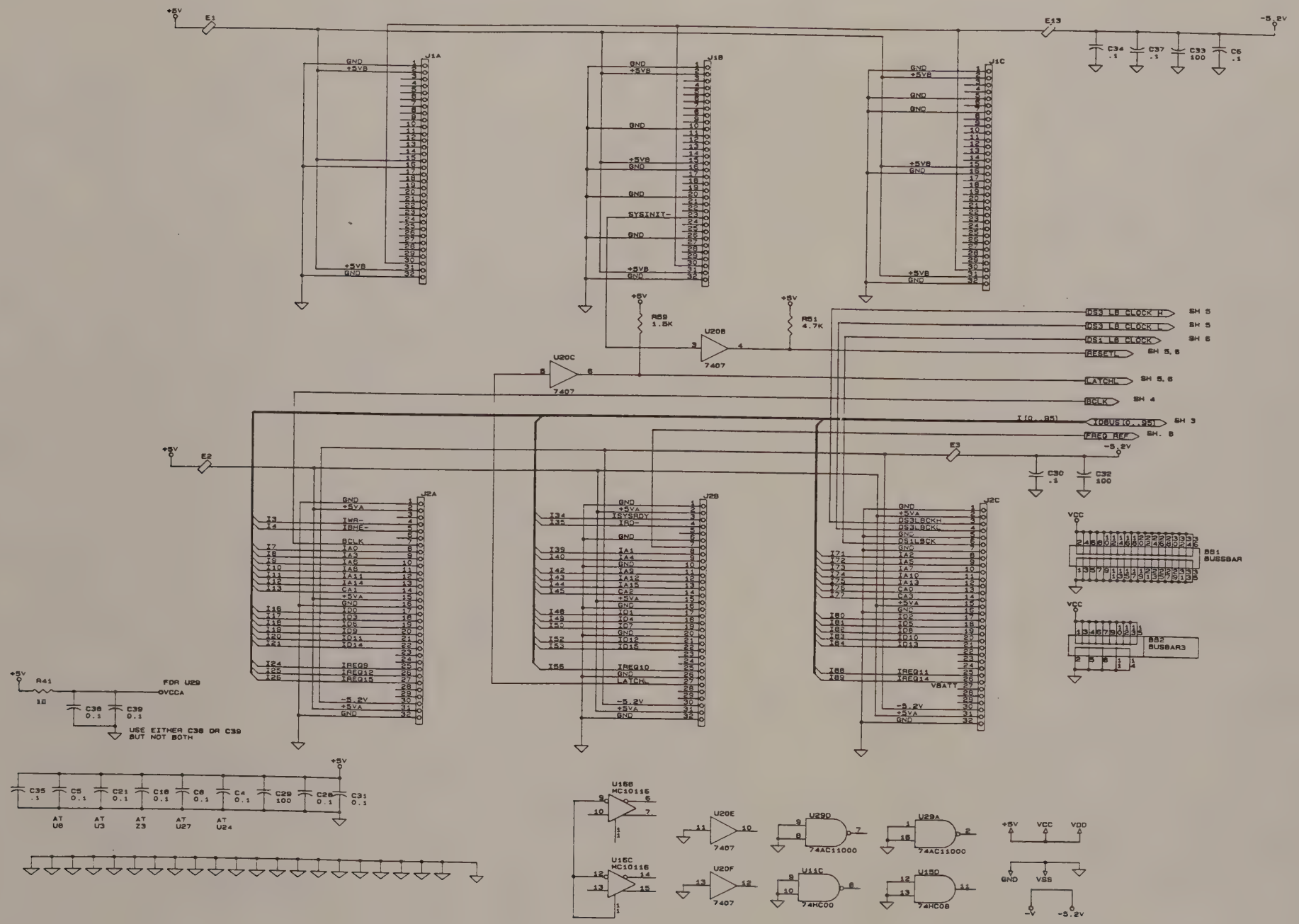


Figure 5.22. **Transmitter PWB Subassembly Schematic (A1/A3/A1) (Sheet 3 of 6)**

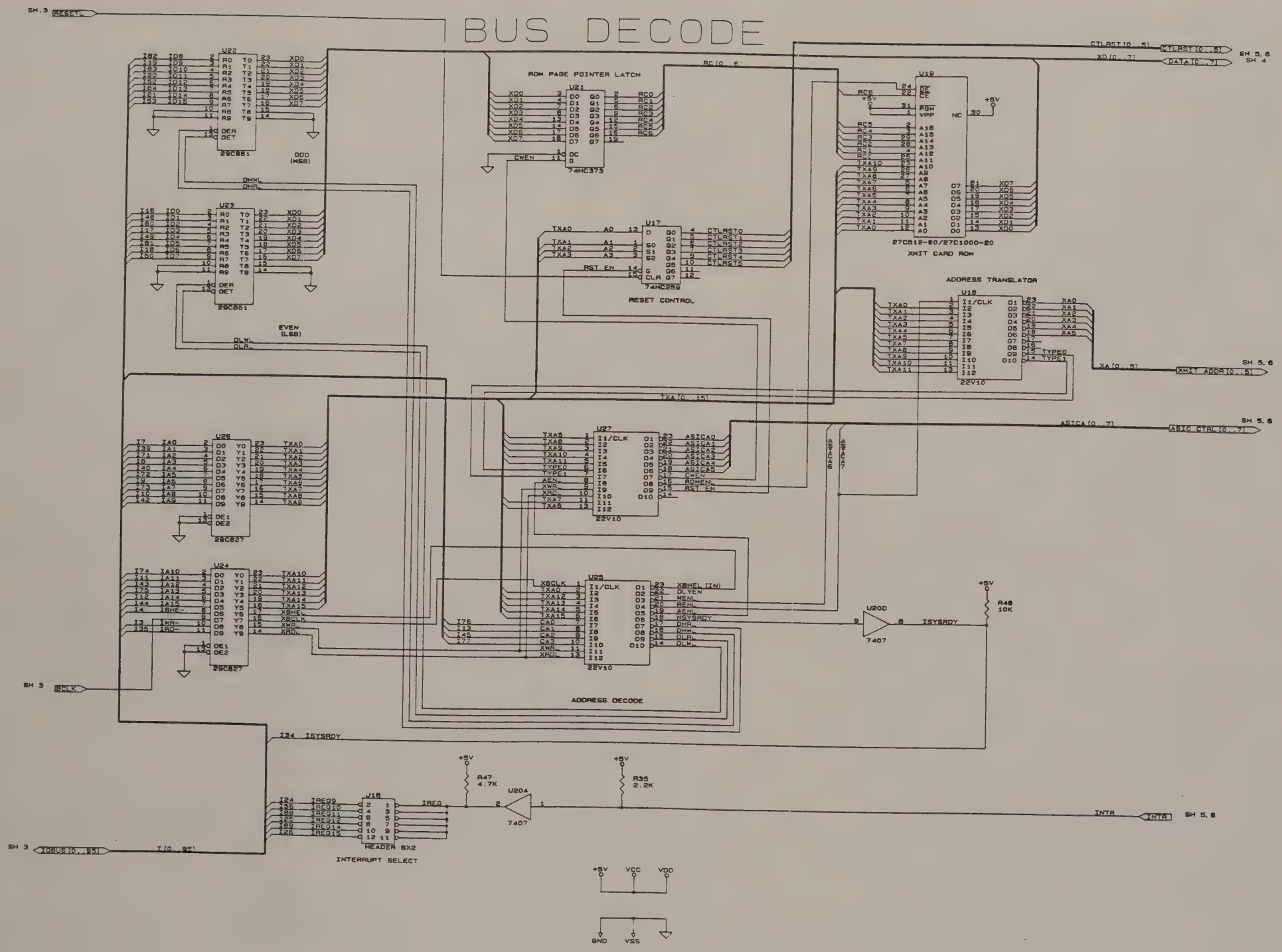


Figure 5.22. Transmitter PWB Subassembly Schematic (A1/A3/A1) (Sheet 4 of 6)

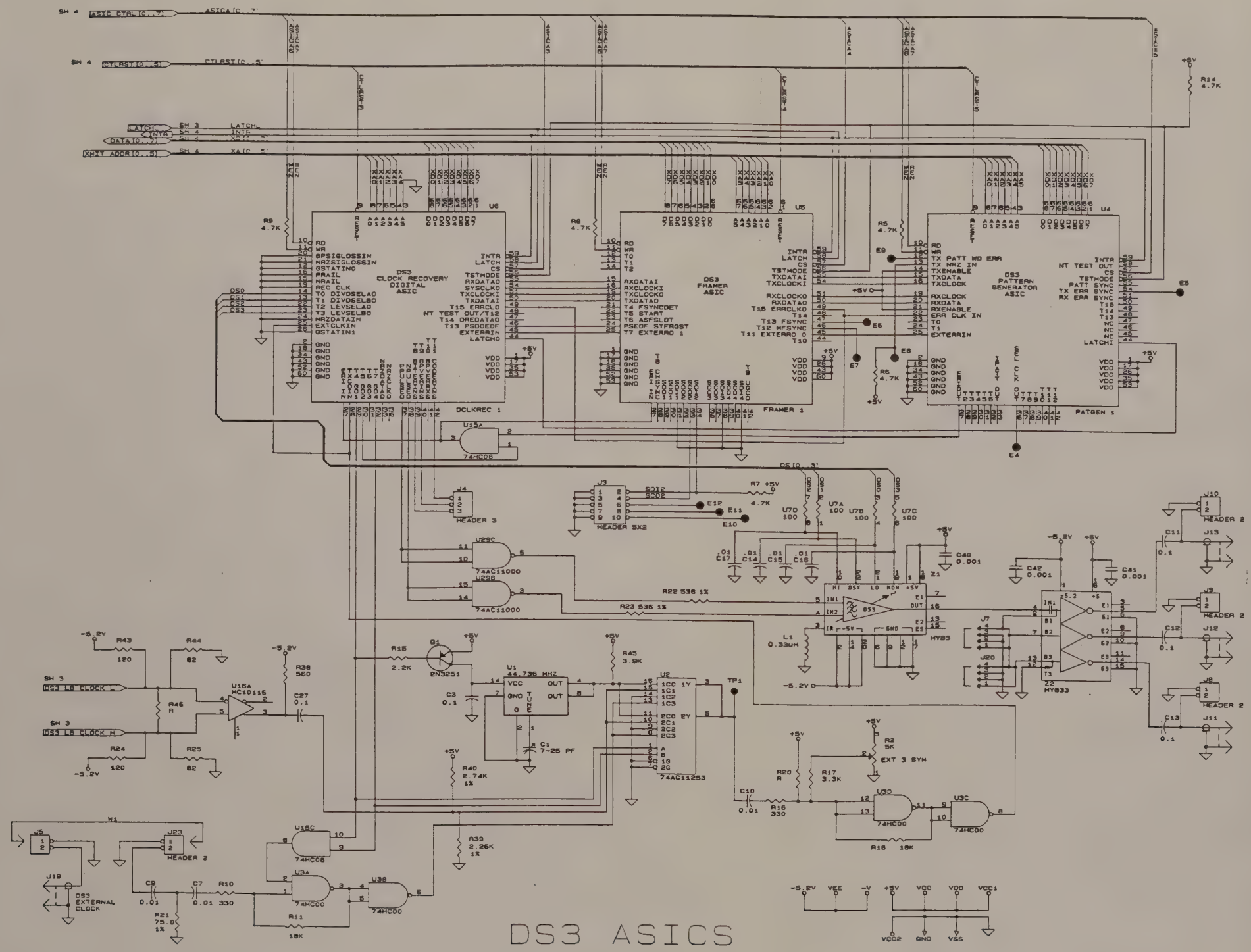


Figure 5.22. **Transmitter PWB Subassembly Schematic (A1/A3/A1) (Sheet 5 of 6)**

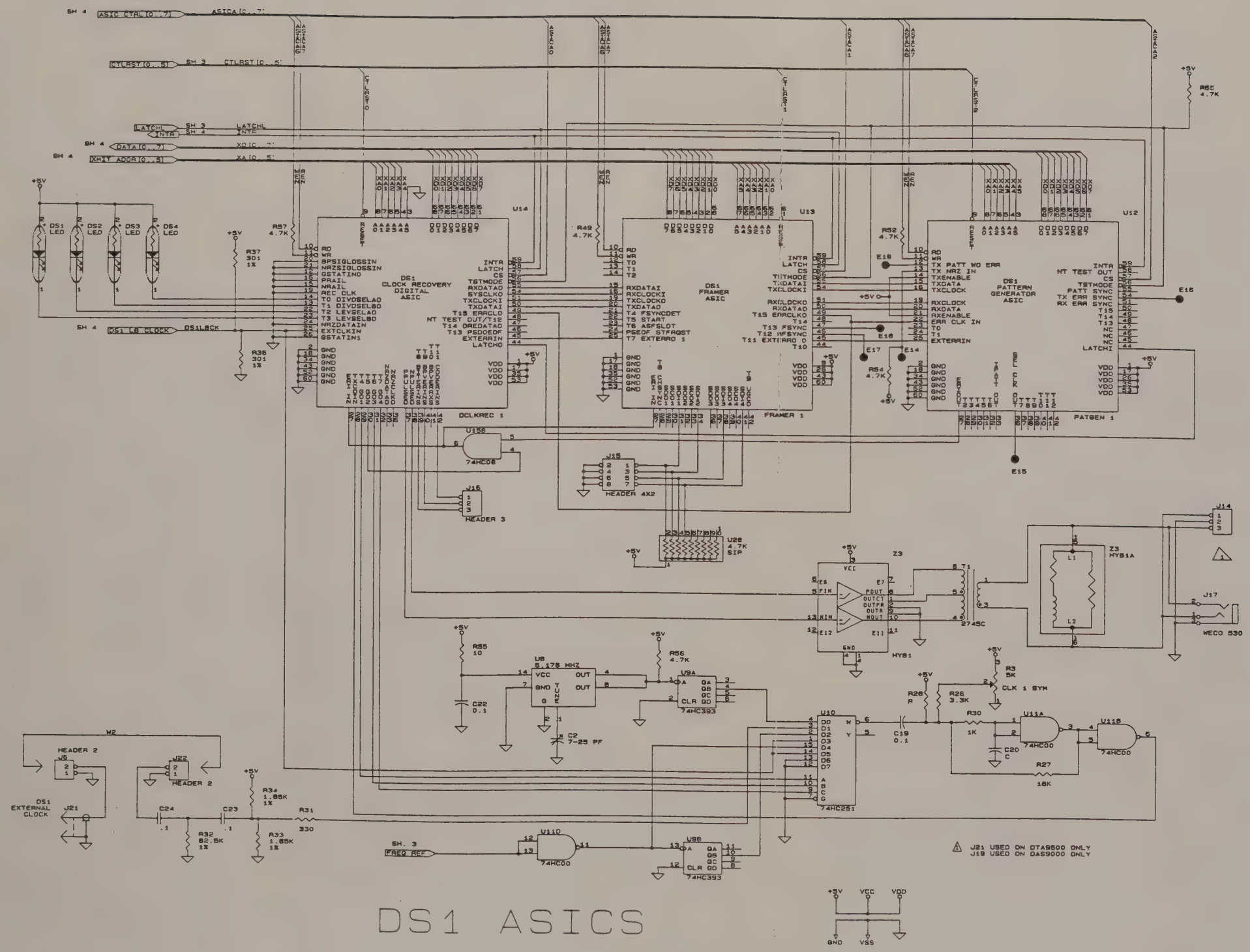


Figure 5.22. **Transmitter PWB Subassembly Schematic (A1/A3/A1) (Sheet 6 of 6)**

309235C
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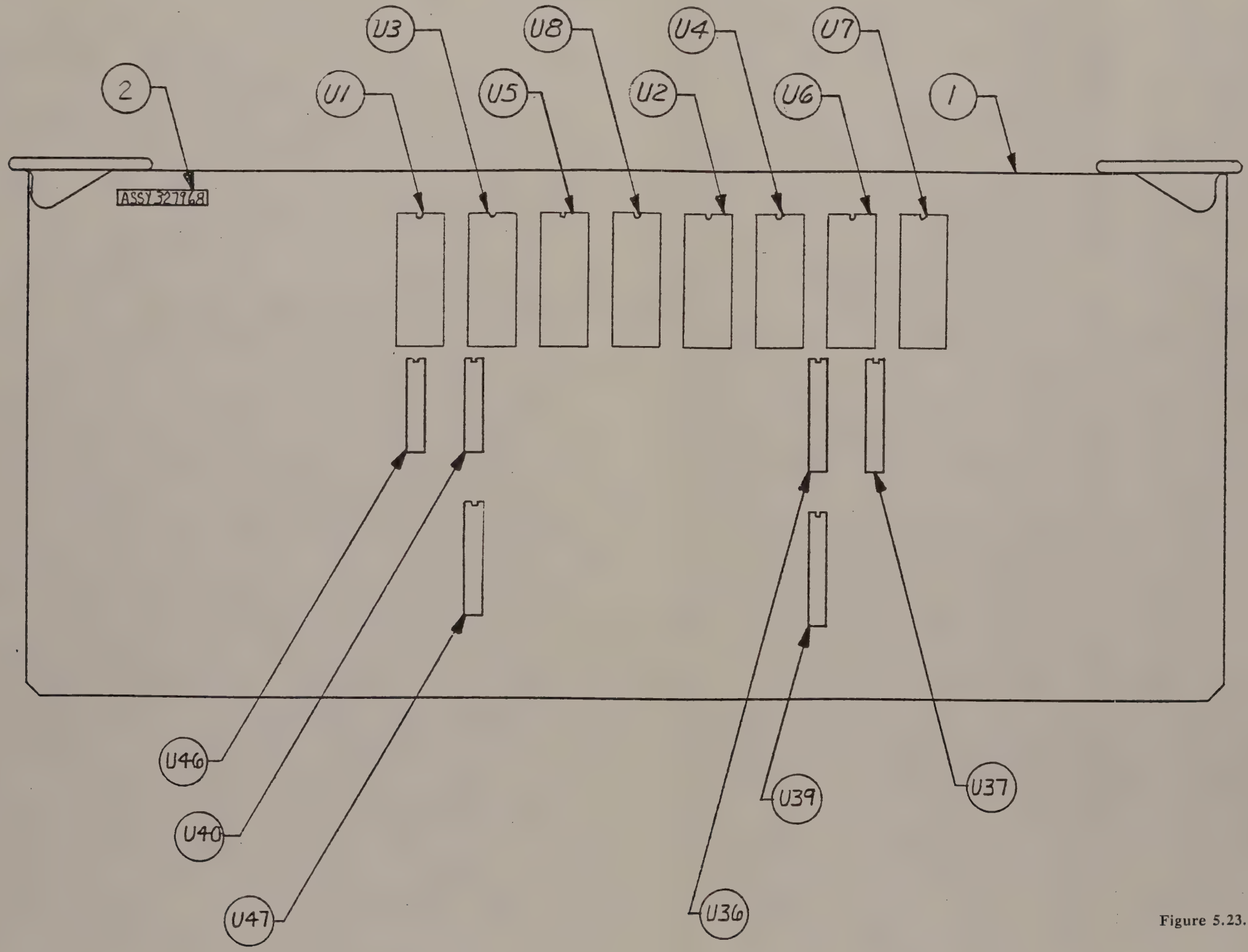
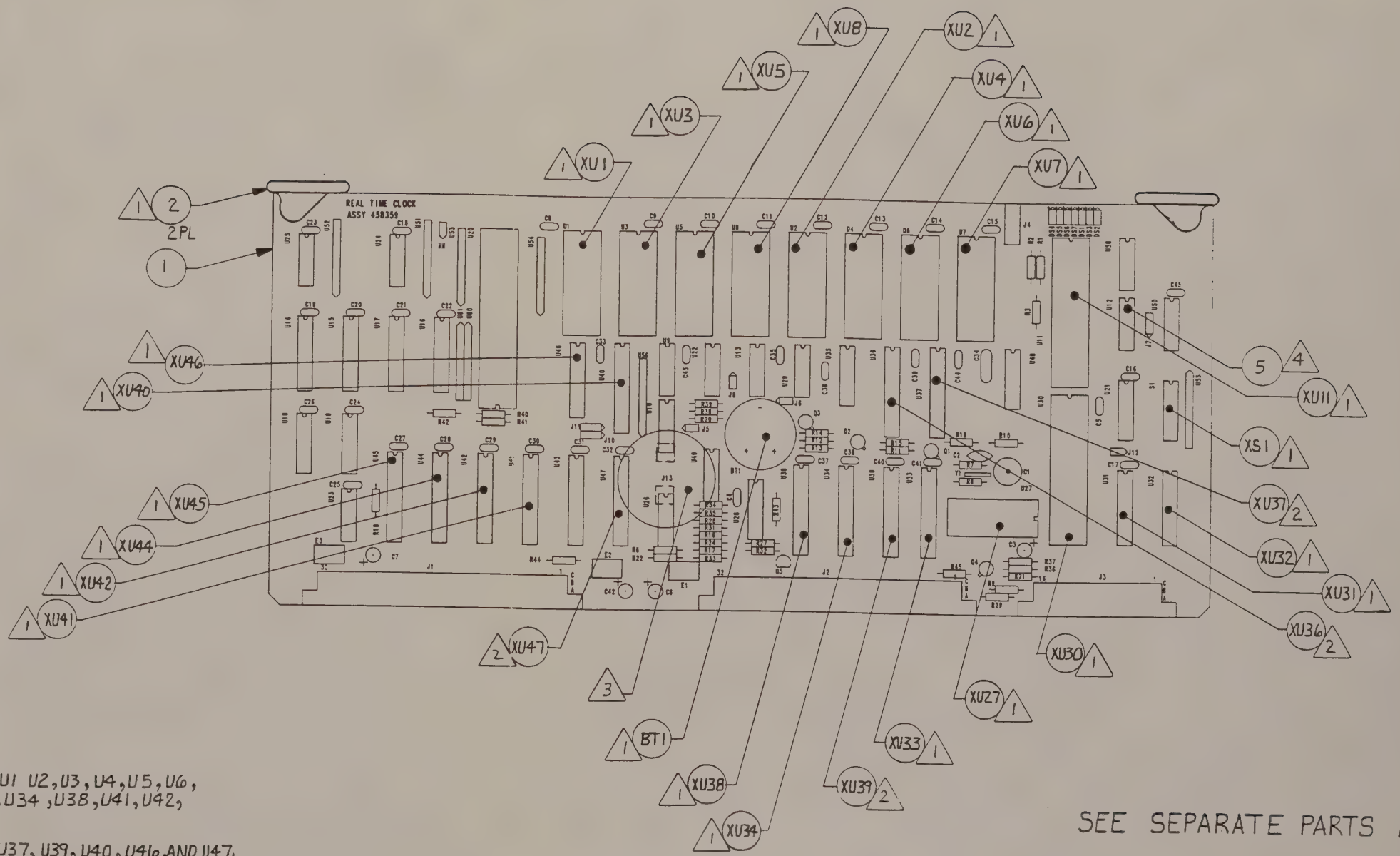
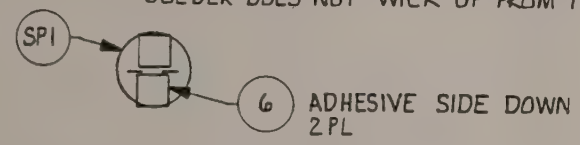


Figure 5.23. Real-Time Clock PWB Assembly (A1/A4)



NOTES:

1. AFTER WAVESOLDER INSTALL BT1, U1 U2, U3, U4, U5, U6, U7, U8, U11, U27, U30, U31, U32, U33, U34, U38, U41, U42, U43, U44, U45, S1, AND ITEM 2.
2. INSTALL ON NEXT ASSEMBLY U36, U37, U39, U40, U46, AND U47.
3. BEFORE INSTALLING SP1 ATTACH 2 0.25 LENGTHS OF ITEM 6 TO SP1 BY PRESSING ITEM 6 ONTO SP1 AS SHOWN: ENSURE SOLDER DOES NOT WICK UP FROM TERMINALS TO SP1 LUGS.



BOTTOM VIEW

4. MOUNT ITEM 5 UNDER U12 BEFORE WAVESOLDER.

Figure 5.24. Real-Time Clock PWB Subassem (A1/A4/A1)

458359
351052Z

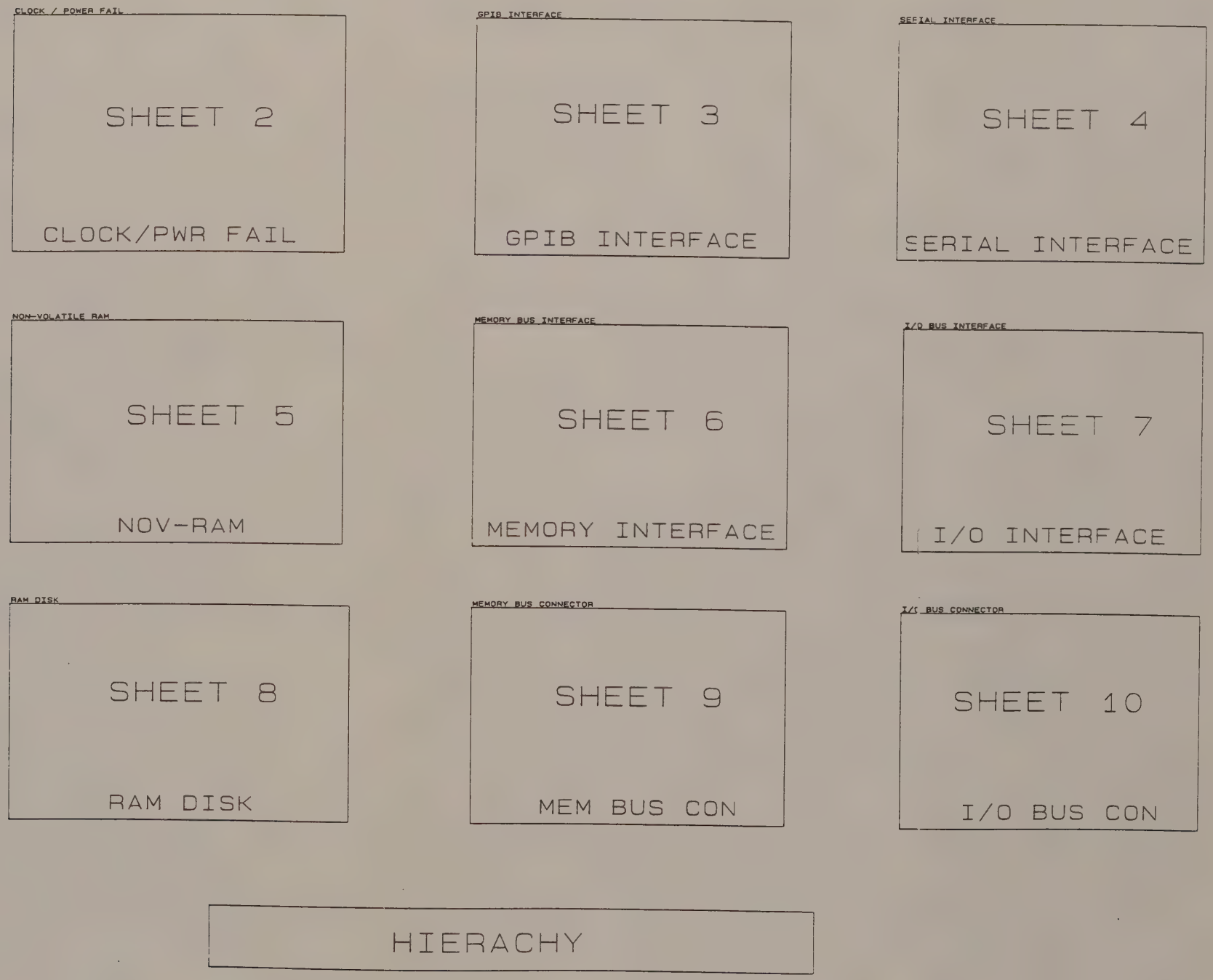
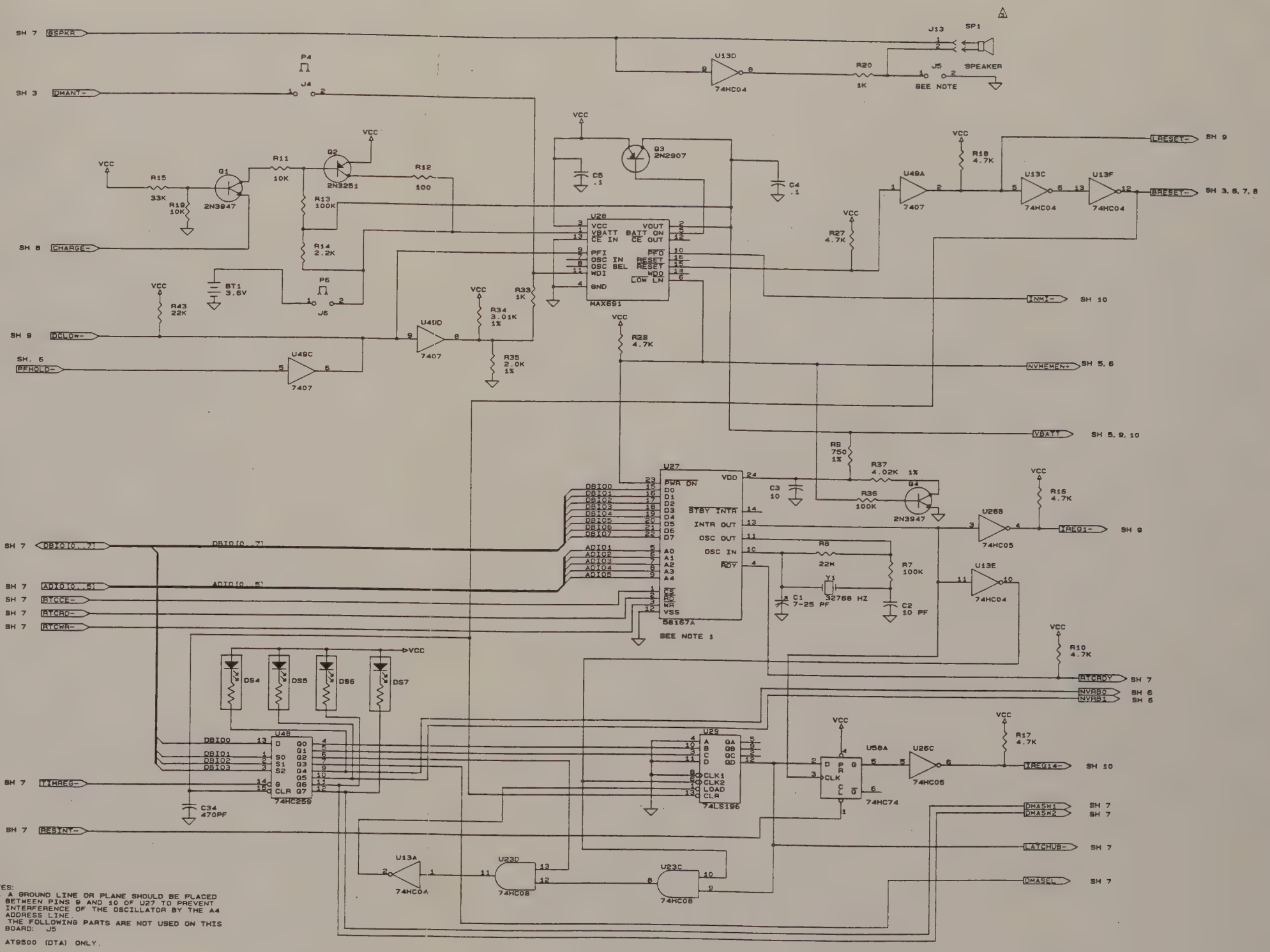


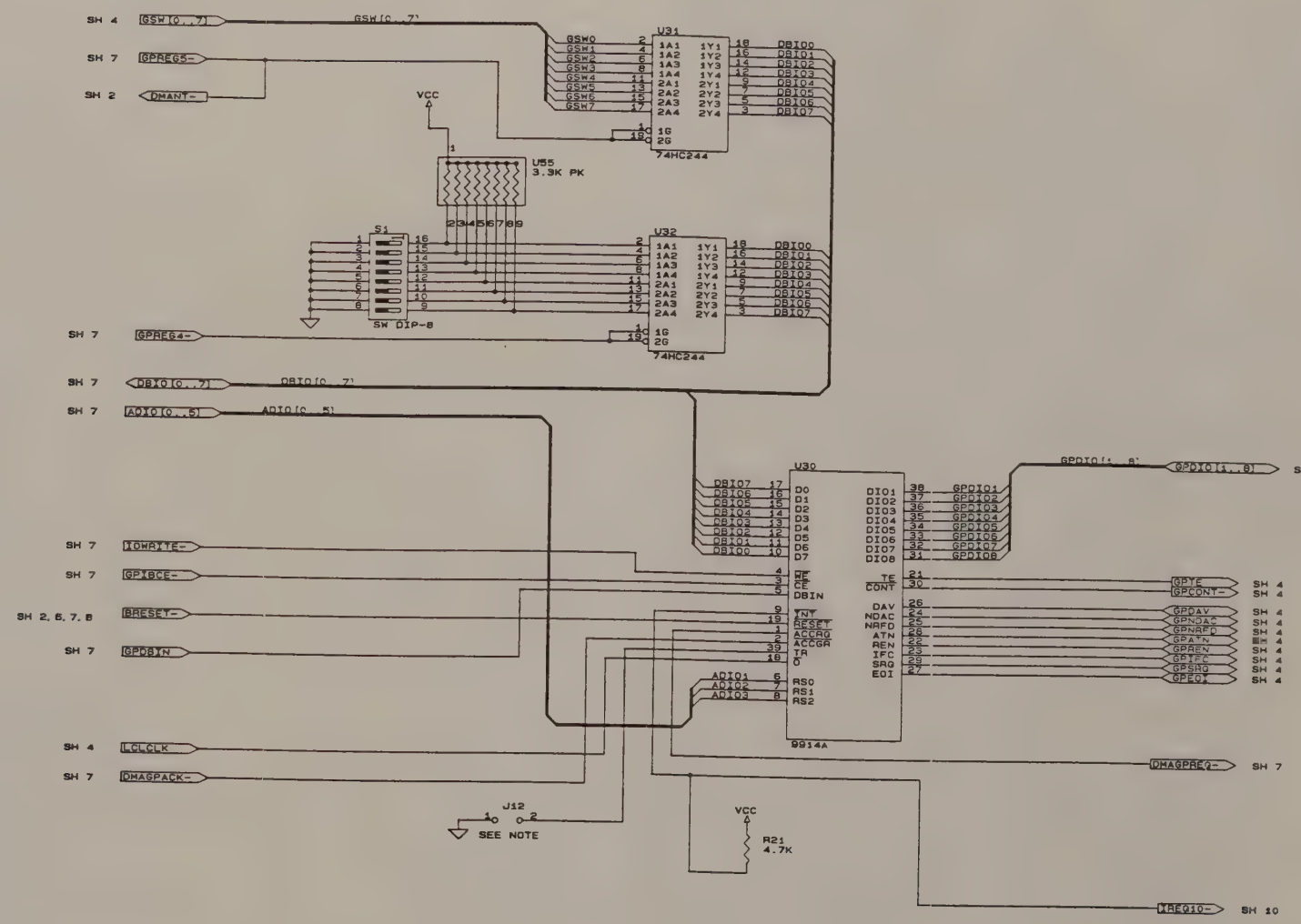
Figure 5.25. **Real-Time Clock PWB Subassembly Schematic (A1/A4/A1) (Sheet 1 of 10)**



NOTES:
1. A GROUND LINE OR PLANE SHOULD BE PLACED BETWEEN PINS 9 AND 10 OF U27 TO PREVENT INTERFERENCE OF THE OSCILLATOR BY THE A4 ADDRESS LINE.
2. THE FOLLOWING PARTS ARE NOT USED ON THIS BOARD: J5

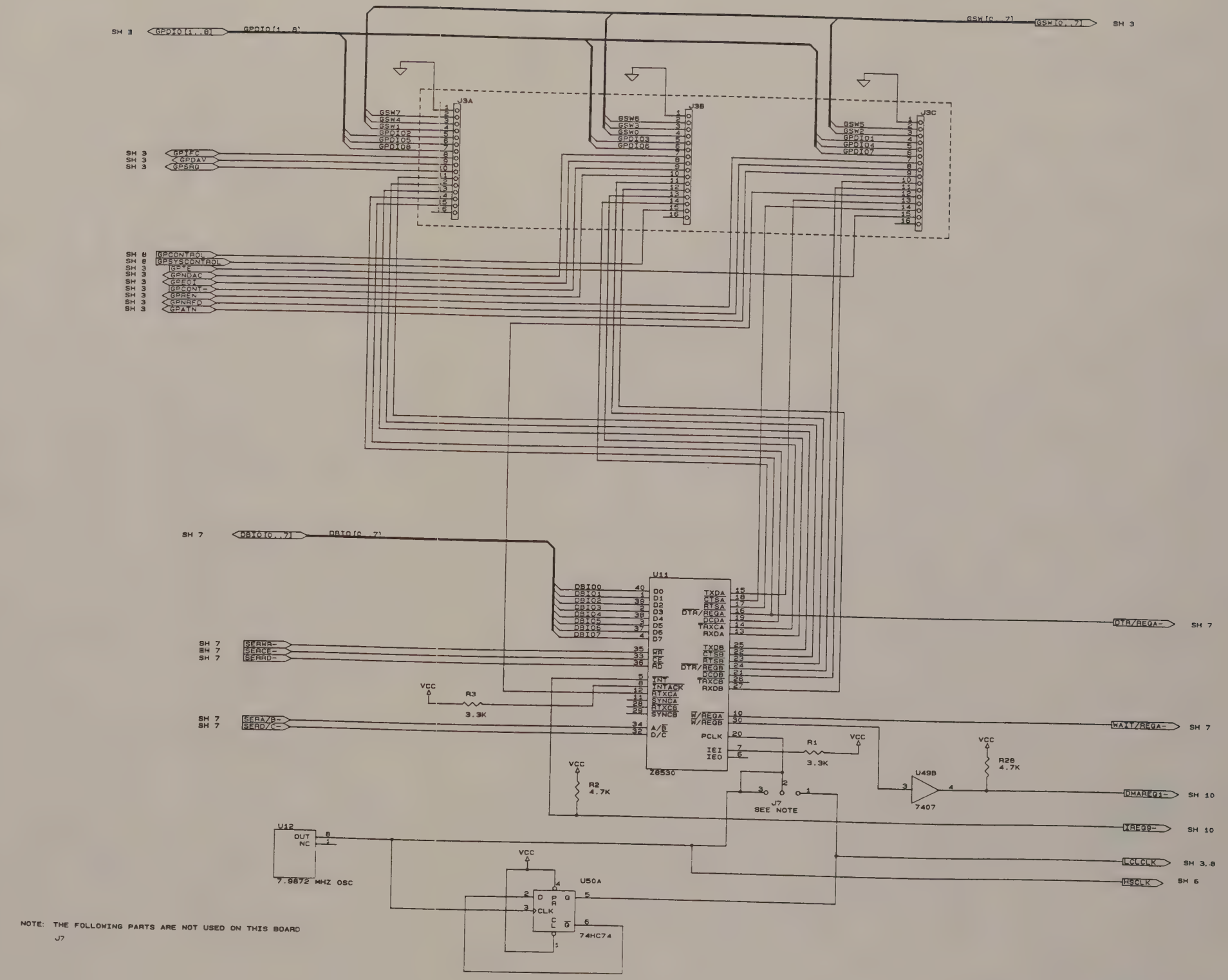
⚠ AT9500 (DTA) ONLY.

Figure 5.25. Real-Time Clock PWB Subassembly Schematic (A1/A4/A1) (Sheet 2 of 10)



NOTE:
J12 NOT USED ON THIS BOARD.

Figure 5.25. Real-Time Clock PWB Subassembly Schematic (A1/A4/A1) (Sheet 3 of 10)



NOTE: THE FOLLOWING PARTS ARE NOT USED ON THIS BOARD
J7

Figure 5.25. Real-Time Clock PWB Subassem Schematic (A1/A4/A1) (Sheet 4 of 10)

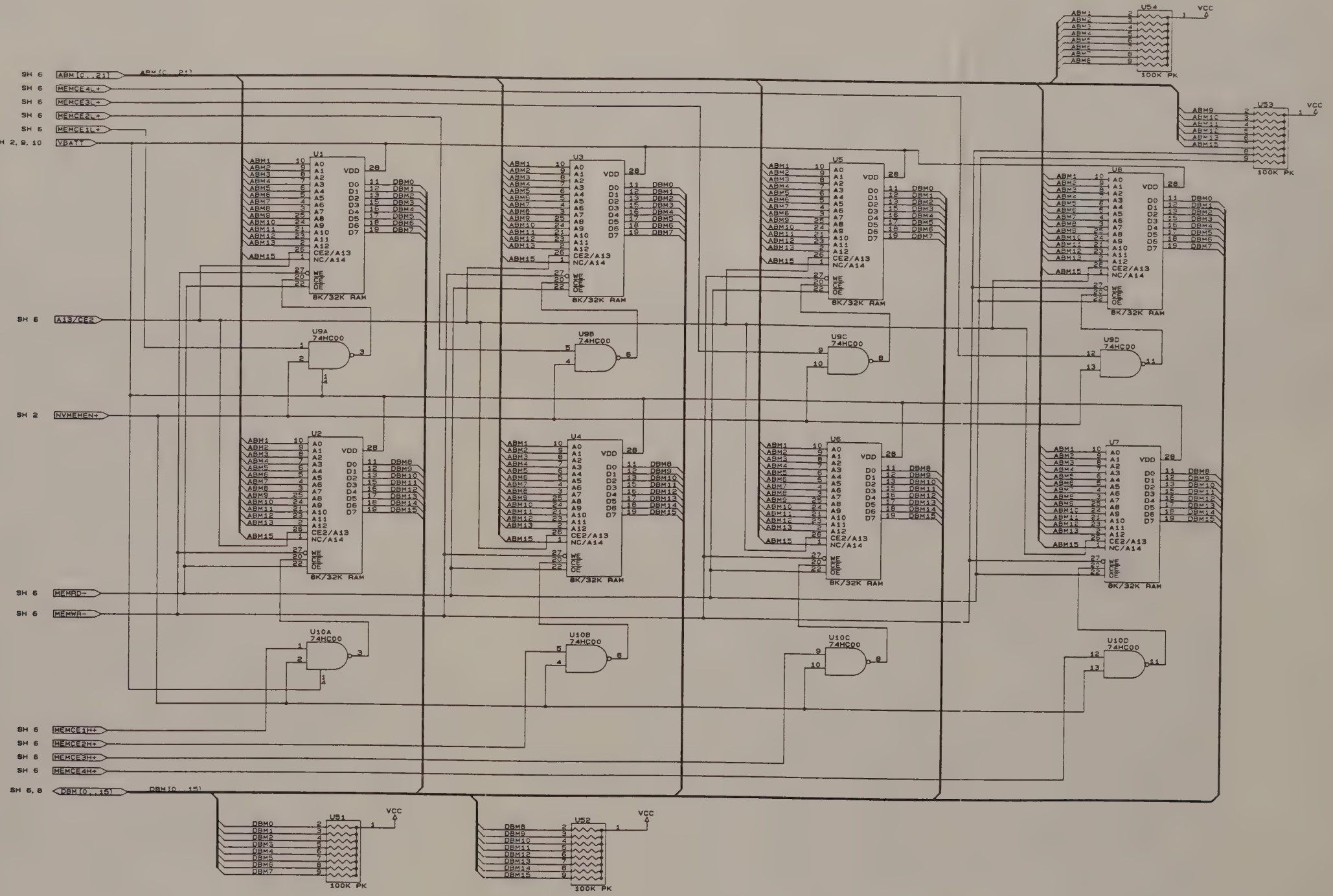
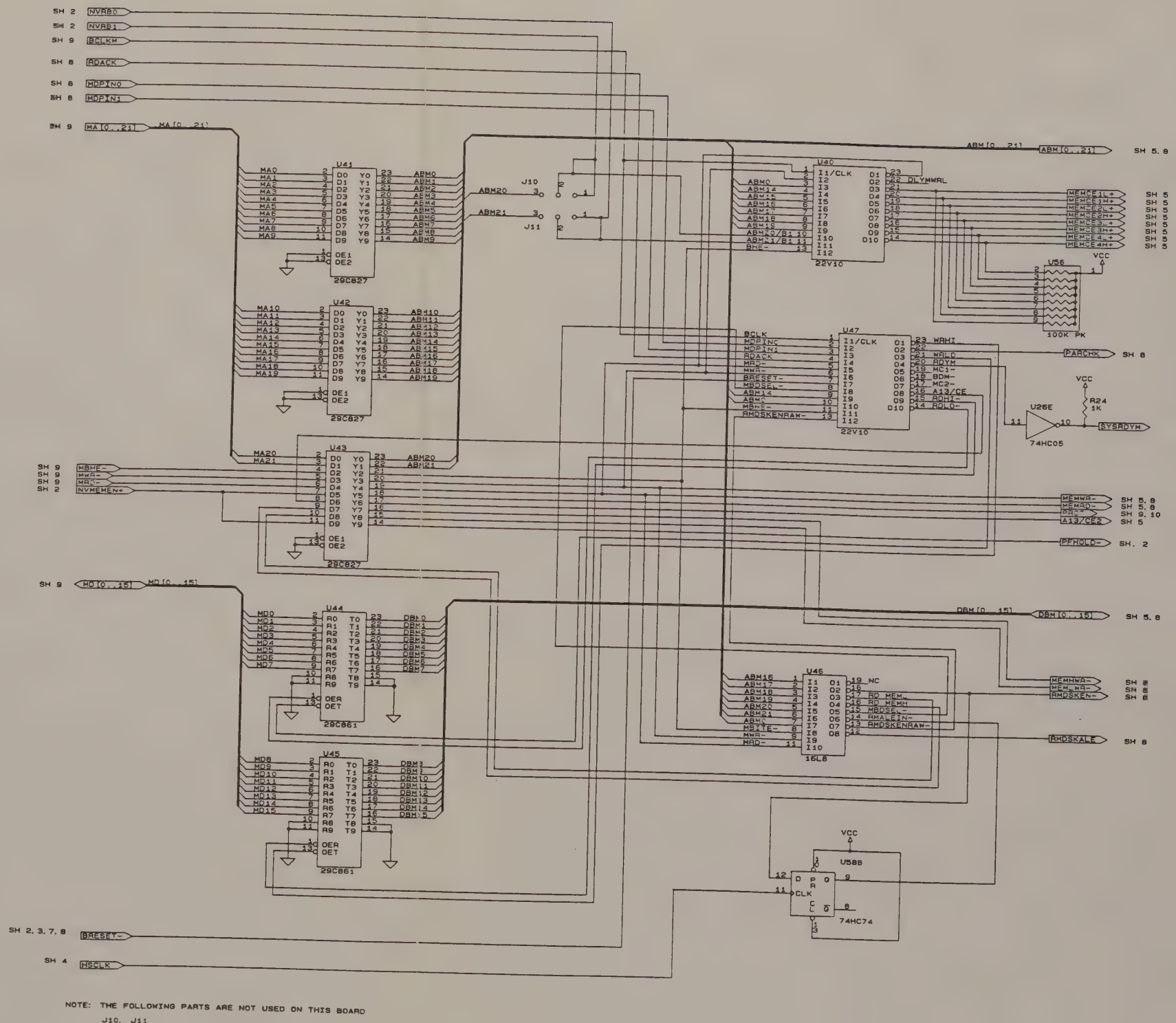


Figure 5.25. Real-Time Clock PWB Subassembly Schematic (A1/A4/A1) (Sheet 5 of 10)

458358
351052Z



NOTE: THE FOLLOWING PARTS ARE NOT USED ON THIS BOARD
J10, J11

Figure 5.25. Real-Time Clock PWB Subassembly Schematic (A1/A4/A1) (Sheet 6 of 10)

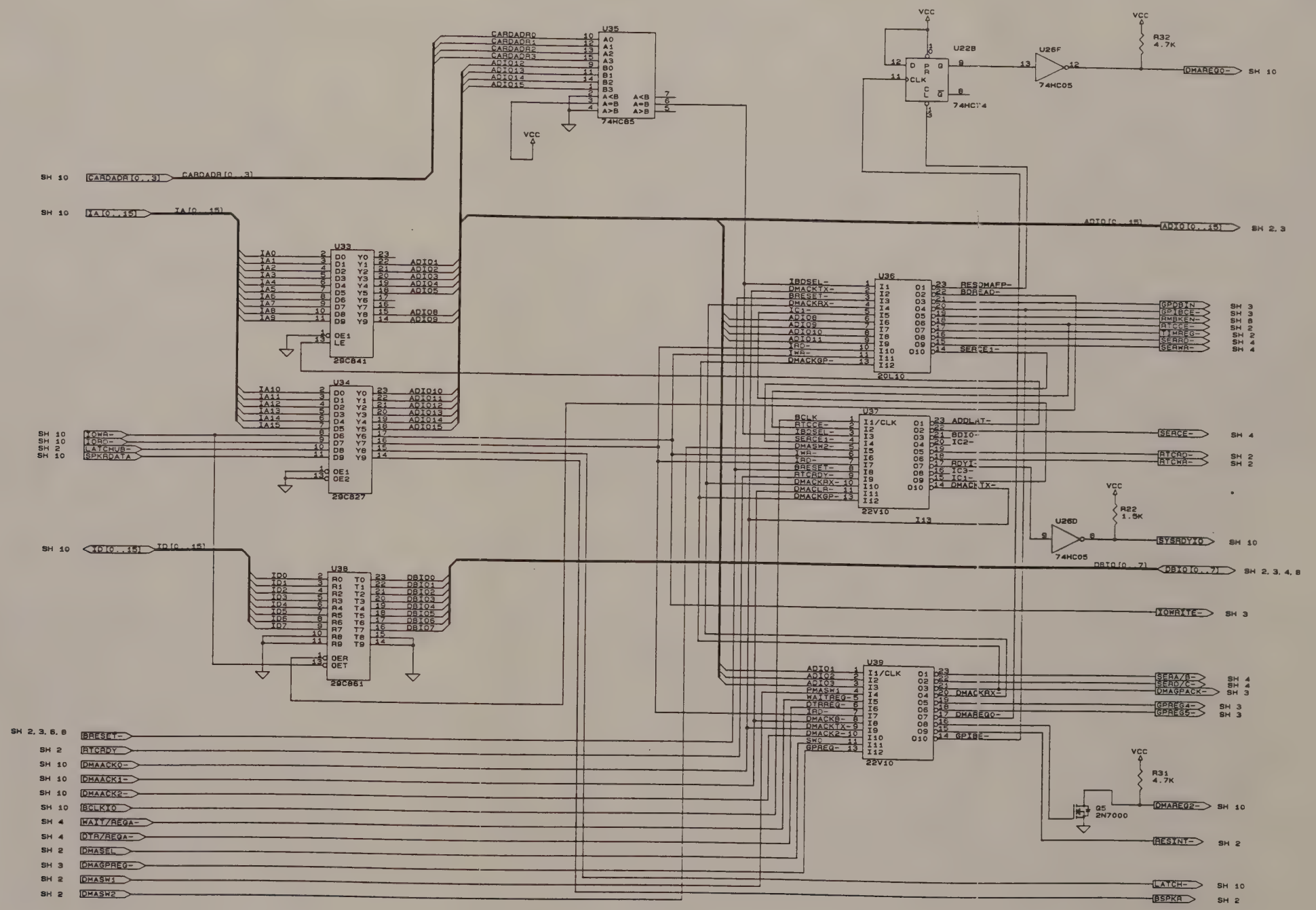
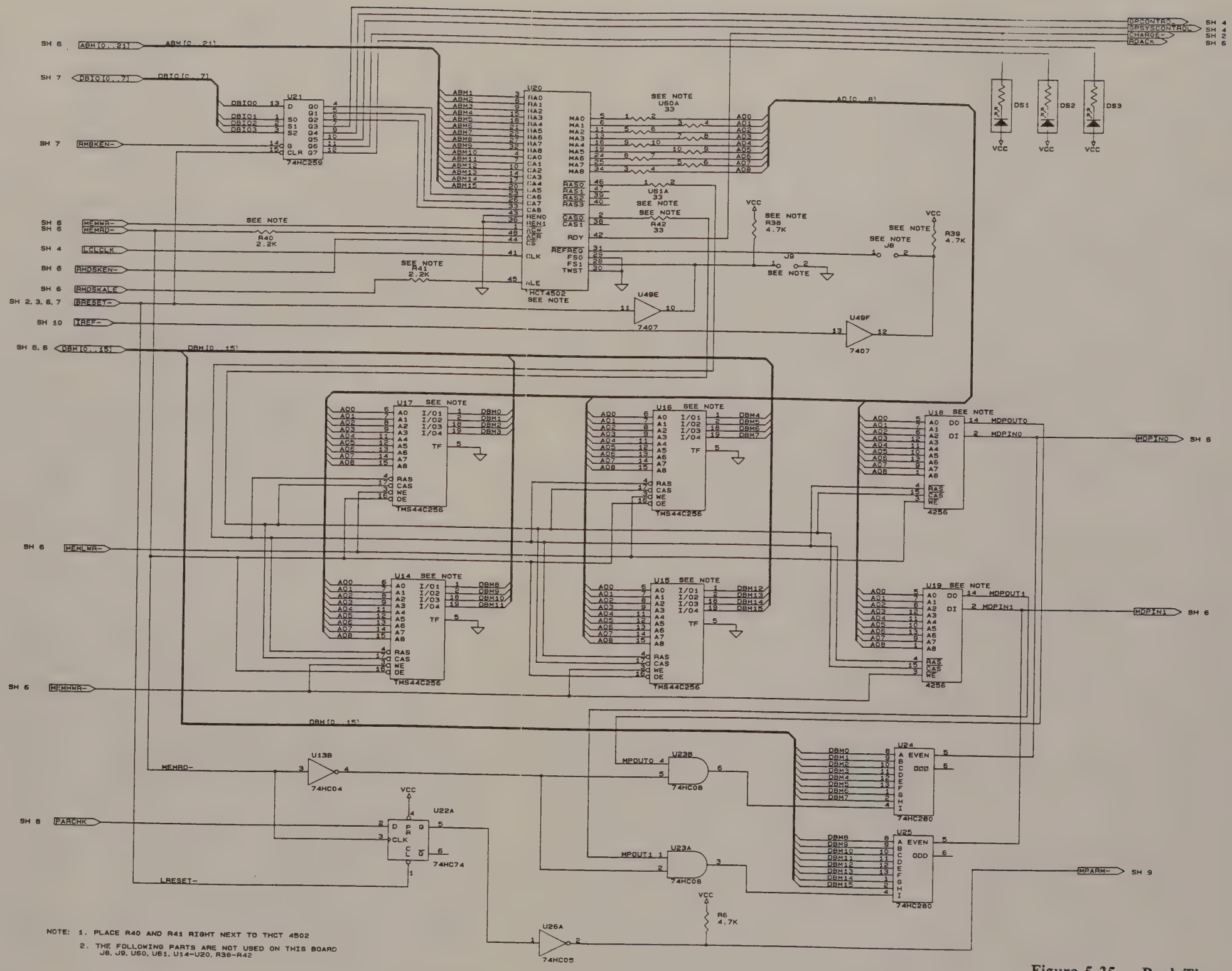


Figure 5.25. Real-Time Clock PWB Subassembly Schematic (A1/A4/A1) (Sheet 7 of 10)



NOTE: 1. PLACE R40 AND R41 RIGHT NEXT TO THCT 4502

2. THE FOLLOWING PARTS ARE NOT USED ON THIS BOARD
J8, J9, U50, U51, U14–U20, R38–R42

Figure 5.25. Real-Time Clock PWB Subassembly Schematic (A1/A4/A1) (Sheet 8 of 10)

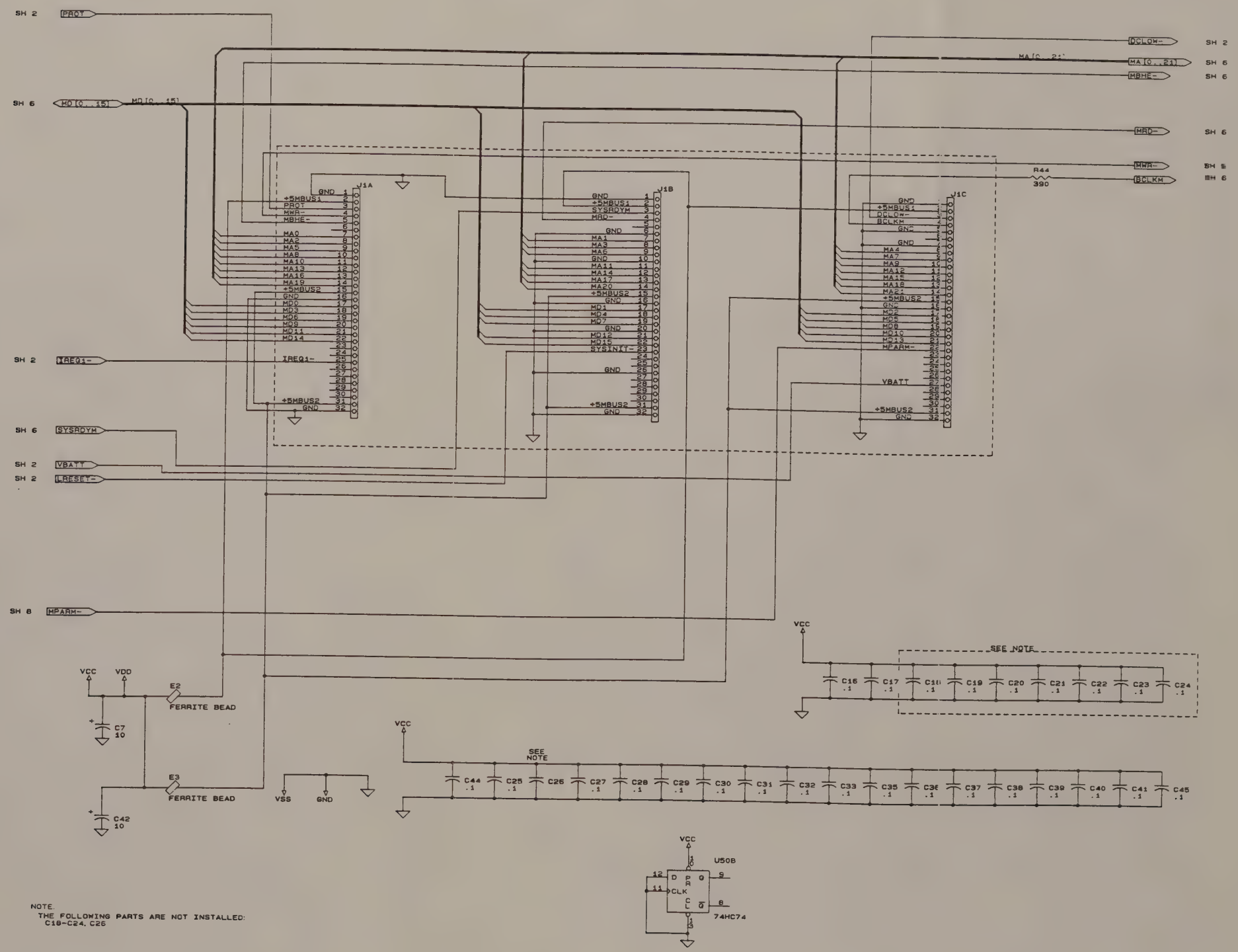


Figure 5.25. Real-Time Clock PWB Subassembly Schematic (A1/A4/A1) (Sheet 9 of 10)

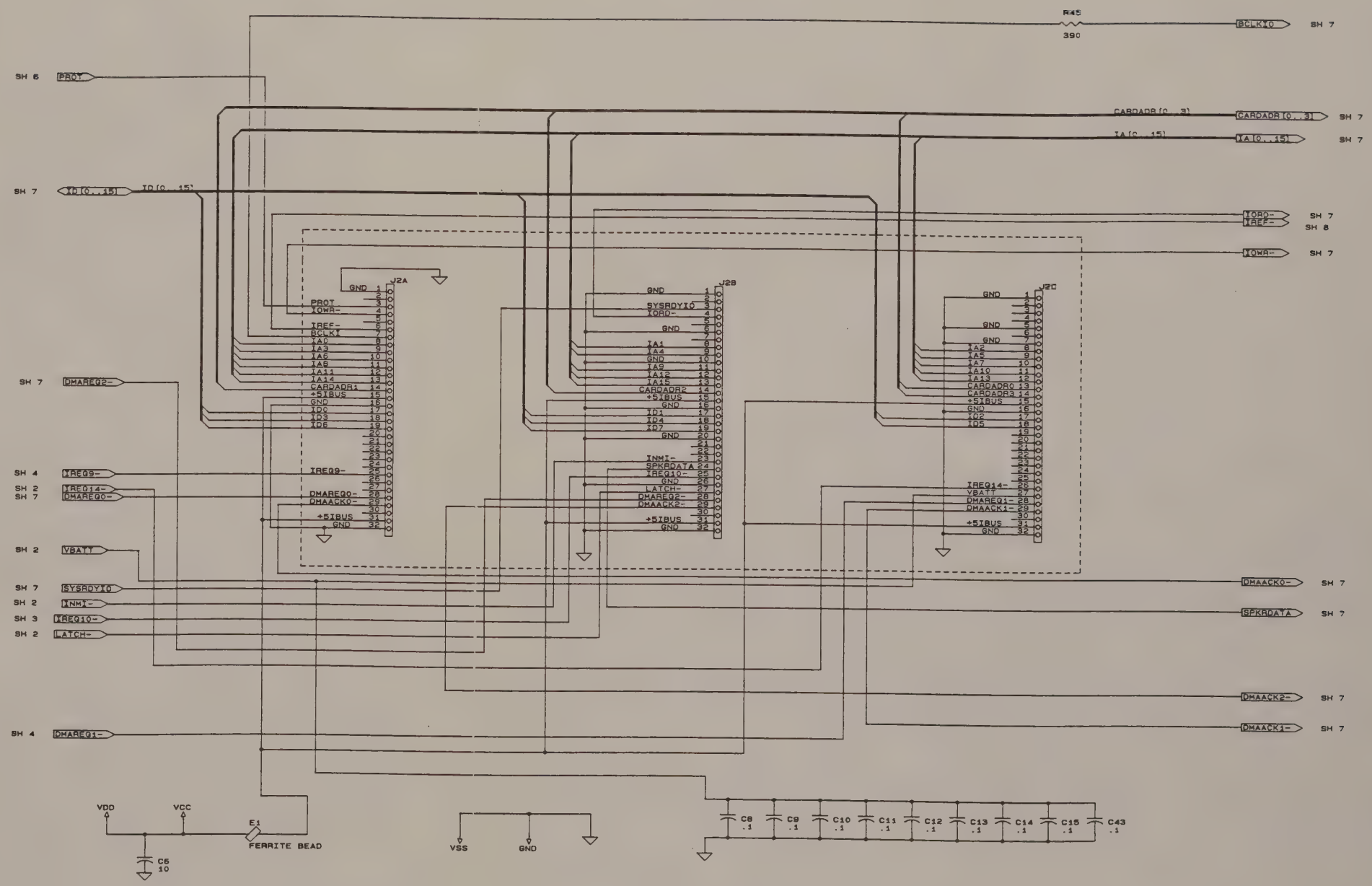


Figure 5.25. Real-Time Clock PWB Subassembly Schematic (A1/A4/A1) (Sheet 10 of 10)

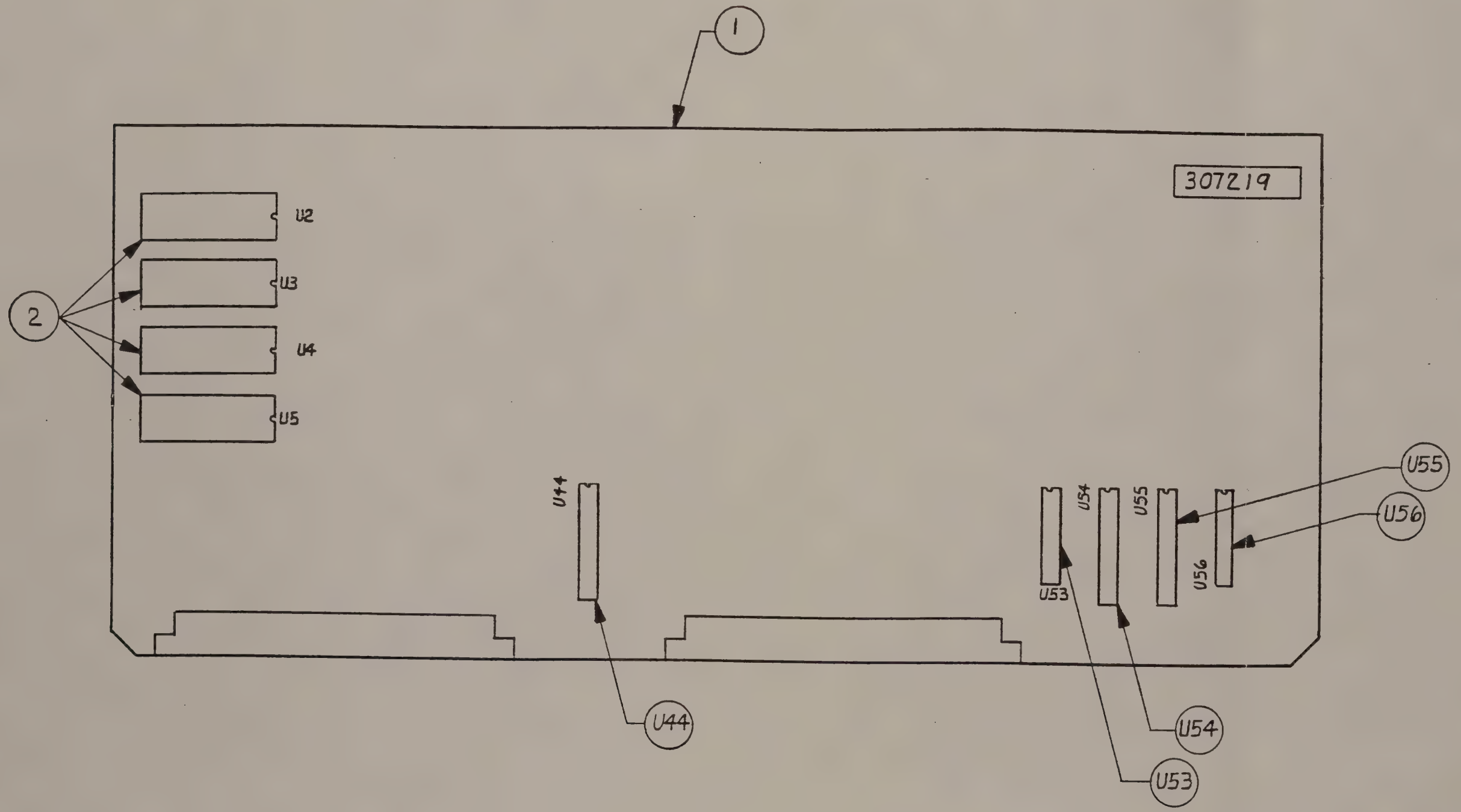
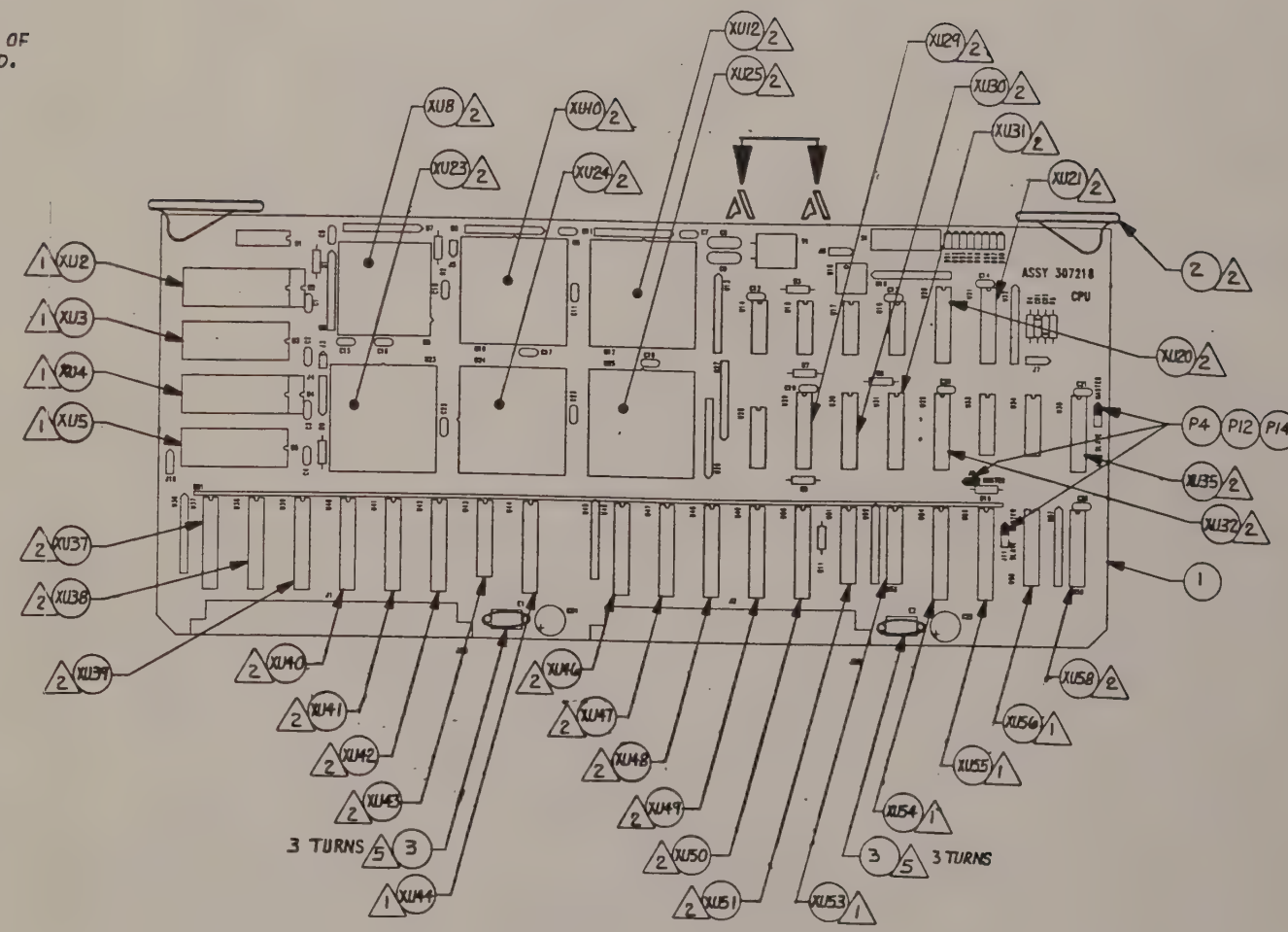
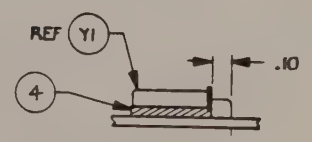


Figure 5.26. CPU PWB Assembly (A1/A5)

NOTES:

1. INSTALL THESE ITEMS ON NEXT ASSEMBLY U2, U3, U4, U5, U44, U53, U54, U55, U56.
2. AFTER WAVE SOLDER INSTALL U8, U10, U12, U23, U24, U25, U29, U30, U31, U20, U21, U32, U35, U37, U38, U39, U40, U41, U42, U43, U46, U47, U48, U49, U50, U51, U53, U58, 2.
3. NOTE LOCATION OF PIN 1 ON XU8, XU10, XU12, XU23, XU24, XU25.
4. INSTALL P4, P12, P14 ON PINS 1 AND 2 AS DENOTED BY SHADED END.
5. NOTE 3 TURNS REFERS TO THE NUMBER OF PASSES THRU THE CENTER OF THE BEAD.





VIEW A1-A1
SCALE: NONE
ROTATED 180°

Figure 5.27. CPU PWB Subassembly (A1/A5/A1)

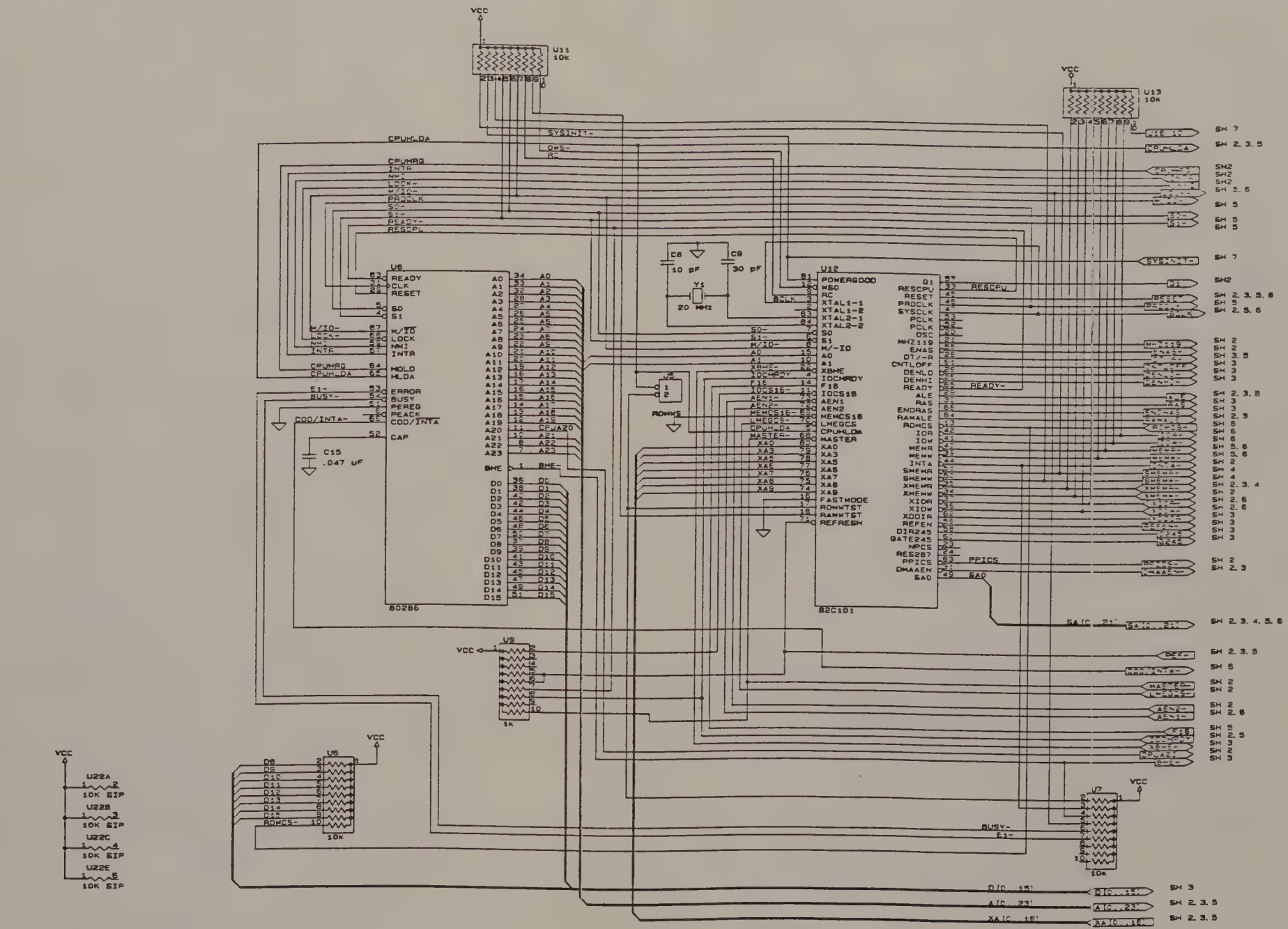


Figure 5.28. CPU PWB Subassembly Schematic (A1/A5/A1) (Sheet 1 of 7)

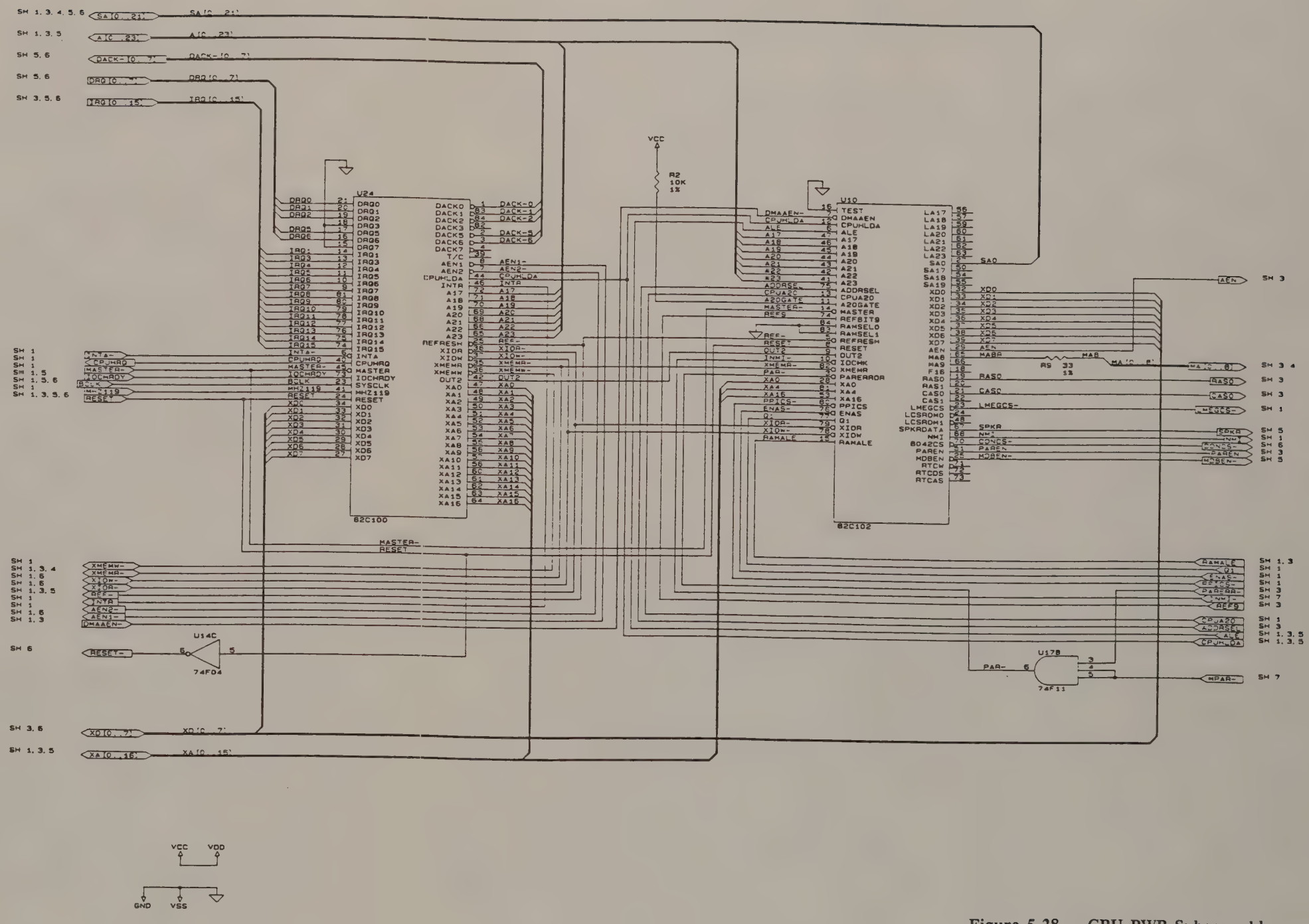


Figure 5.28. CPU PWB Subassembly Schematic (A1/A5/A1) (Sheet 2 of 7)

307216
351052Z

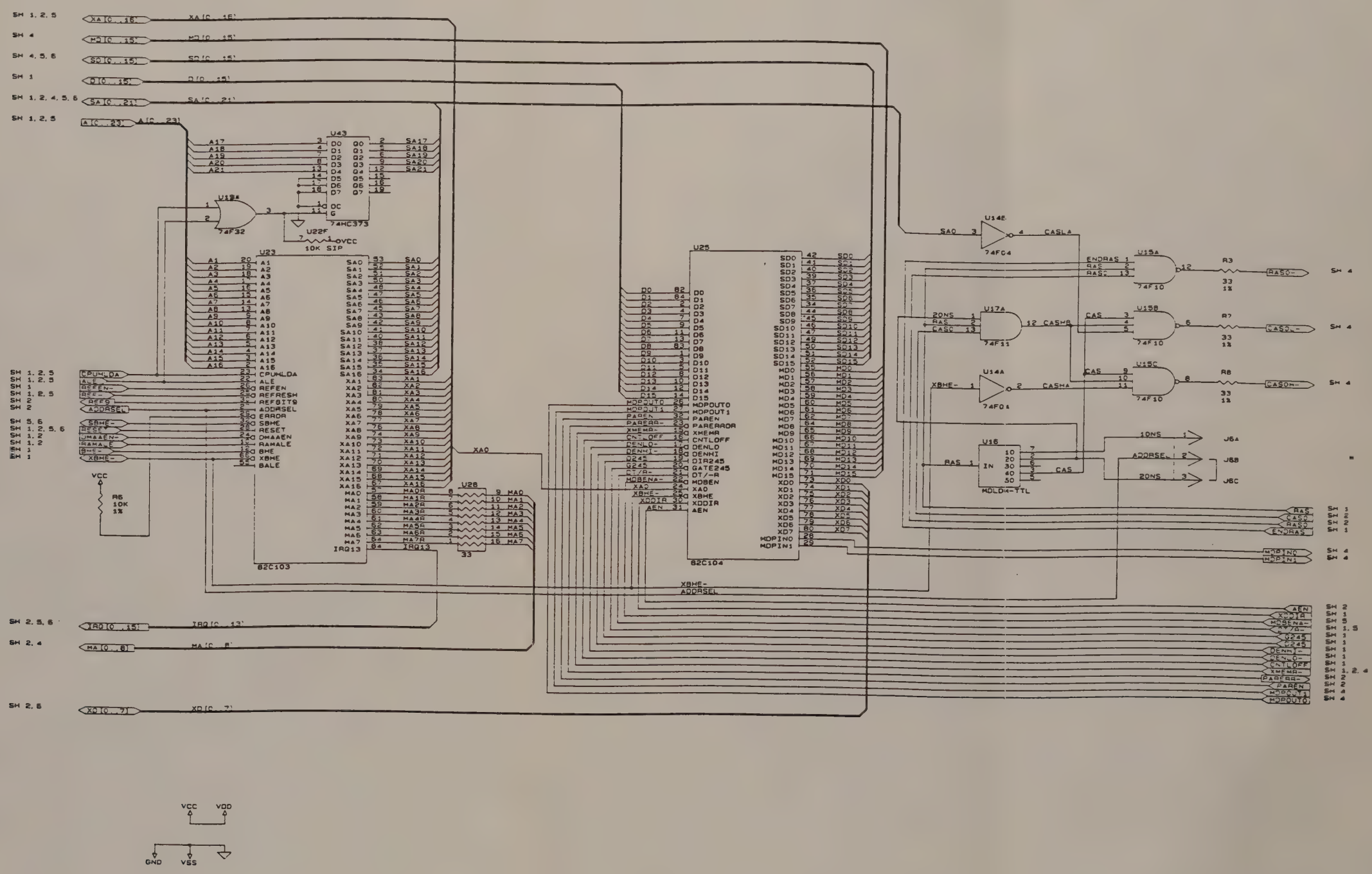
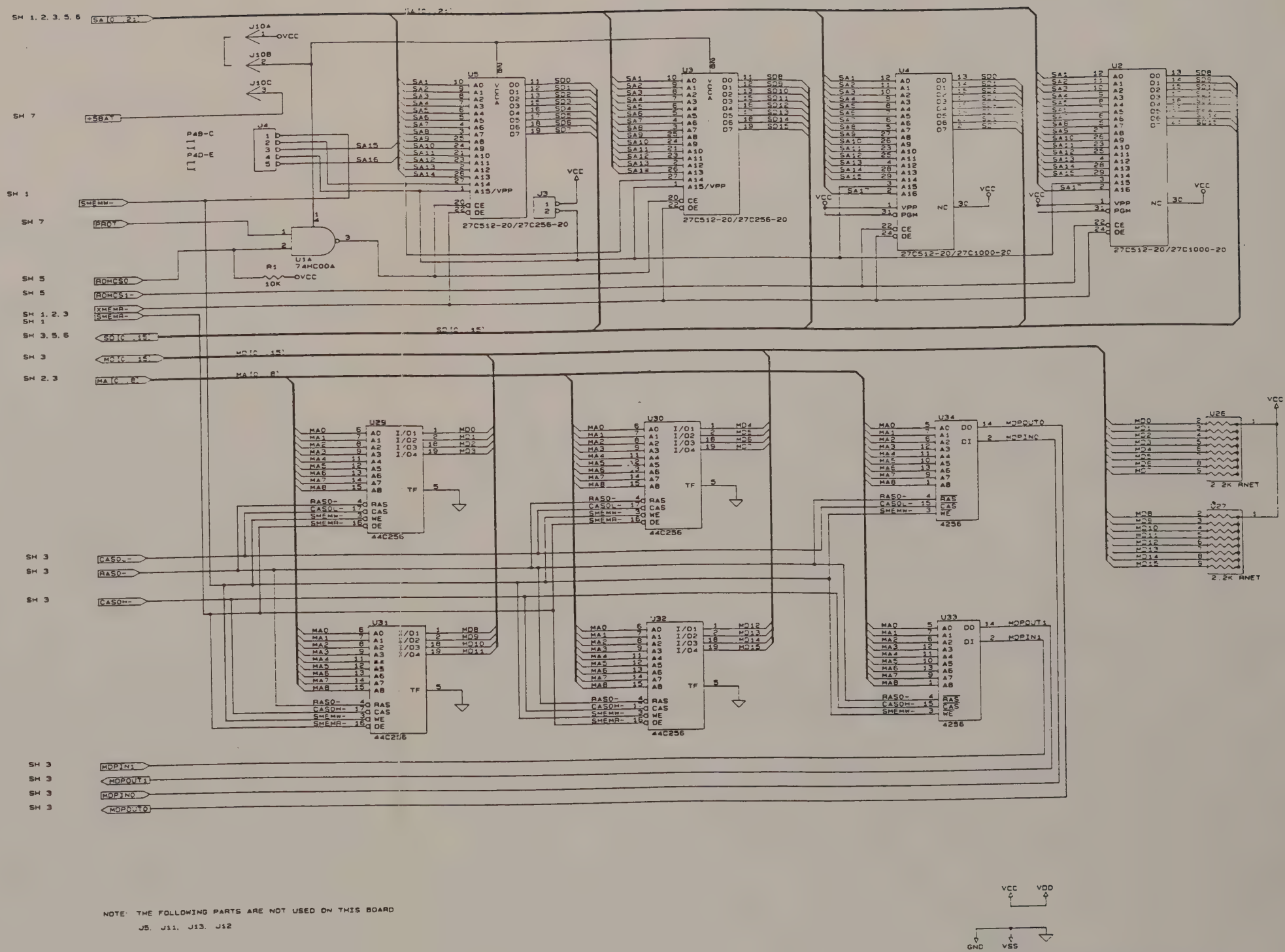


Figure 5.28. CPU PWB Subassembly Schematic (A1/A5/A1) (Sheet 3 of 7)

307216
351052Z



NOTE: THE FOLLOWING PARTS ARE NOT USED ON THIS BOARD
J5, J11, J13, J12

Figure 5.28. CPU PWB Subassembly Schematic (A1/A5/A1) (Sheet 4 of 7)

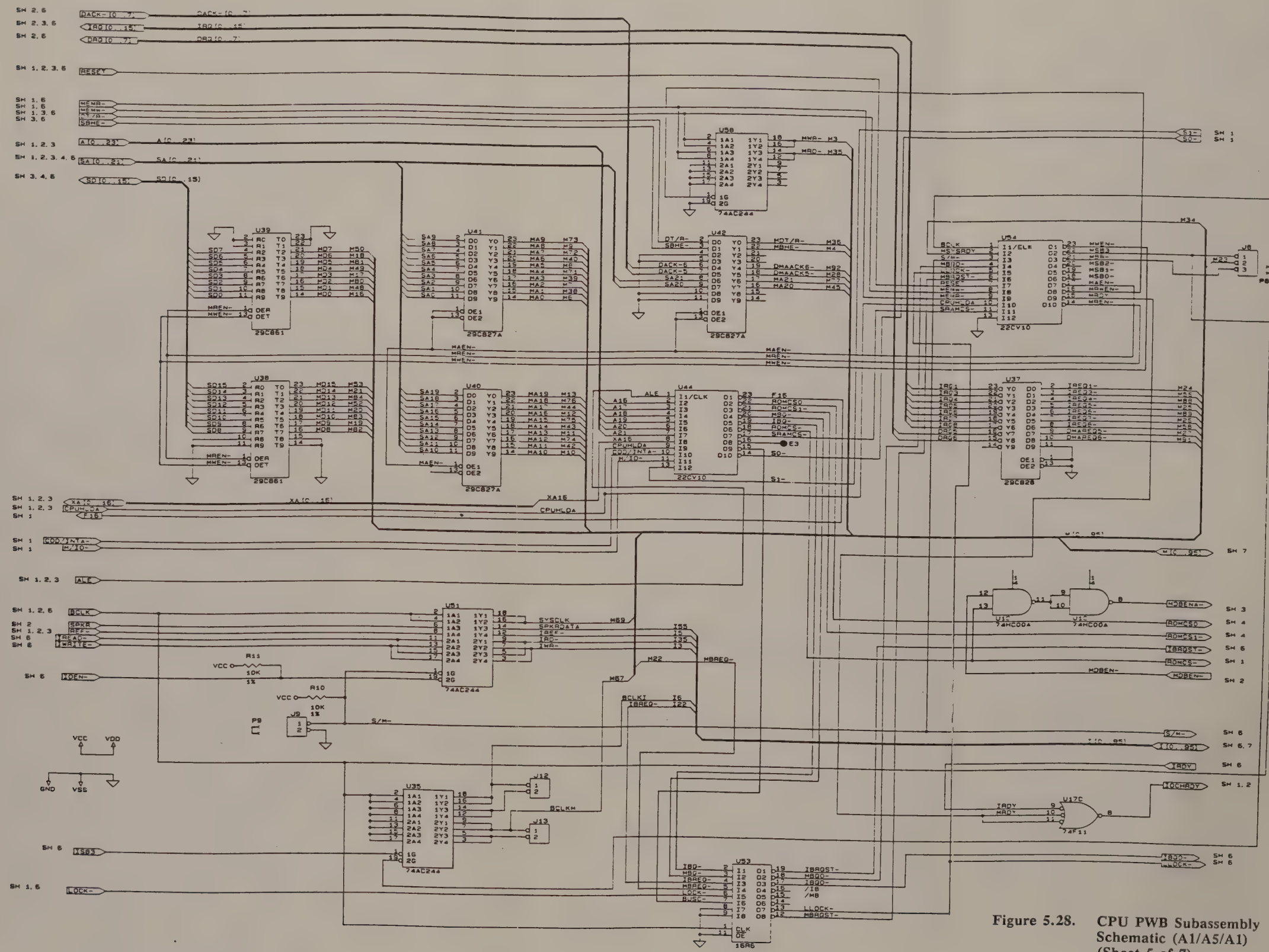


Figure 5.28. CPU PWB Subassembly Schematic (A1/A5/A1) (Sheet 5 of 7)

307216
35I052Z

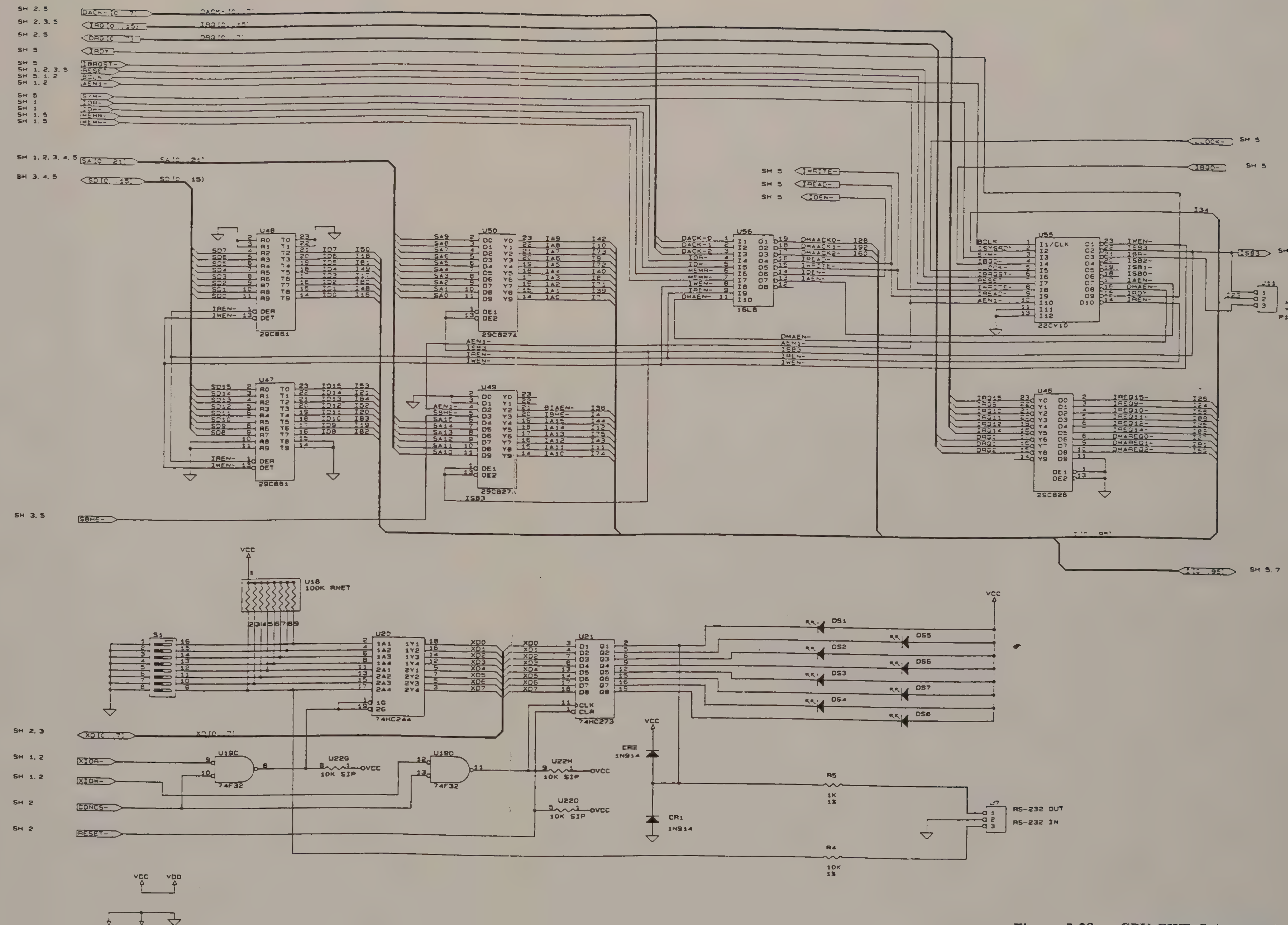


Figure 5.28. CPU PWB Subassembly Schematic (A1/A5/A1) (Sheet 6 of 7)

307216
35I052Z

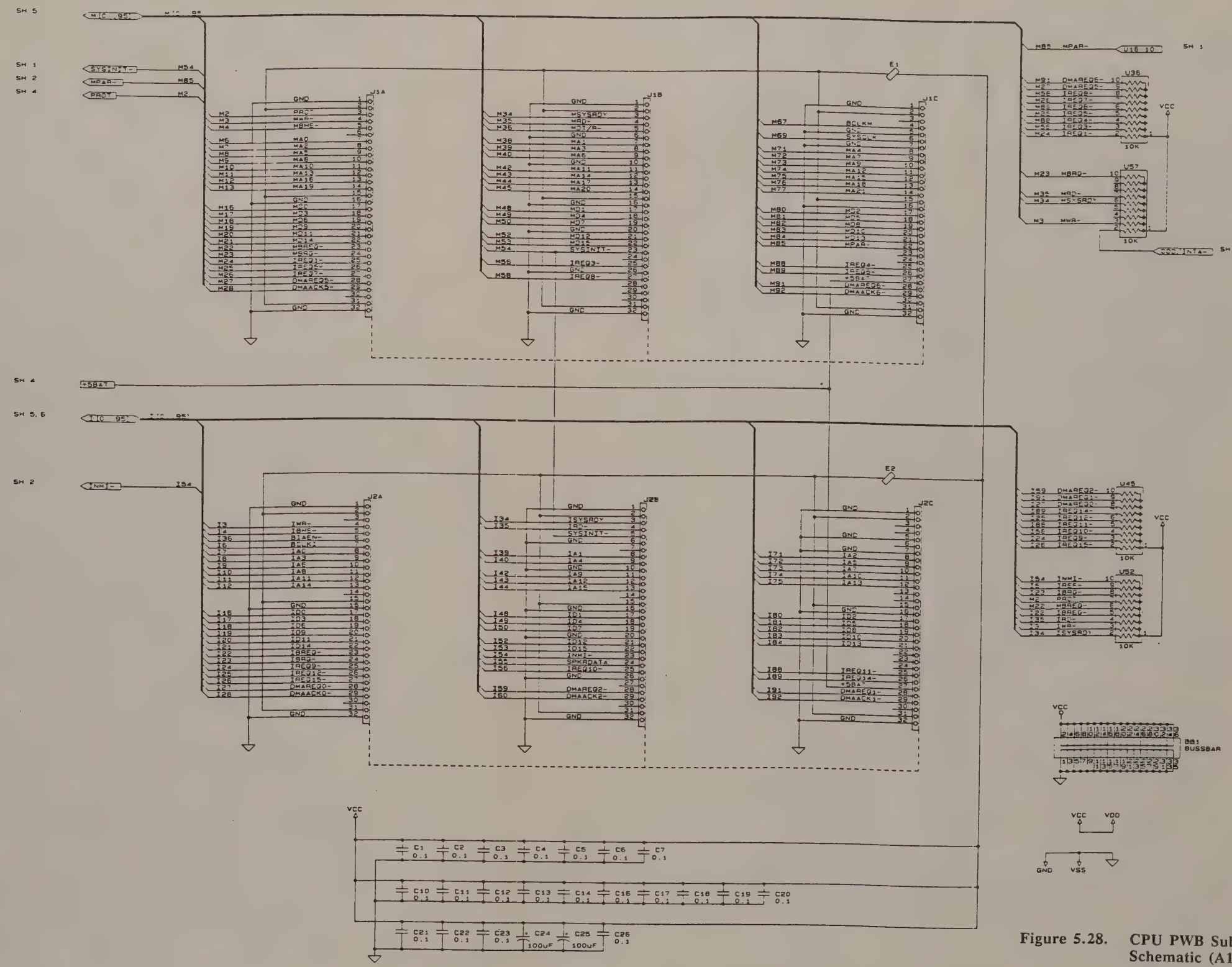
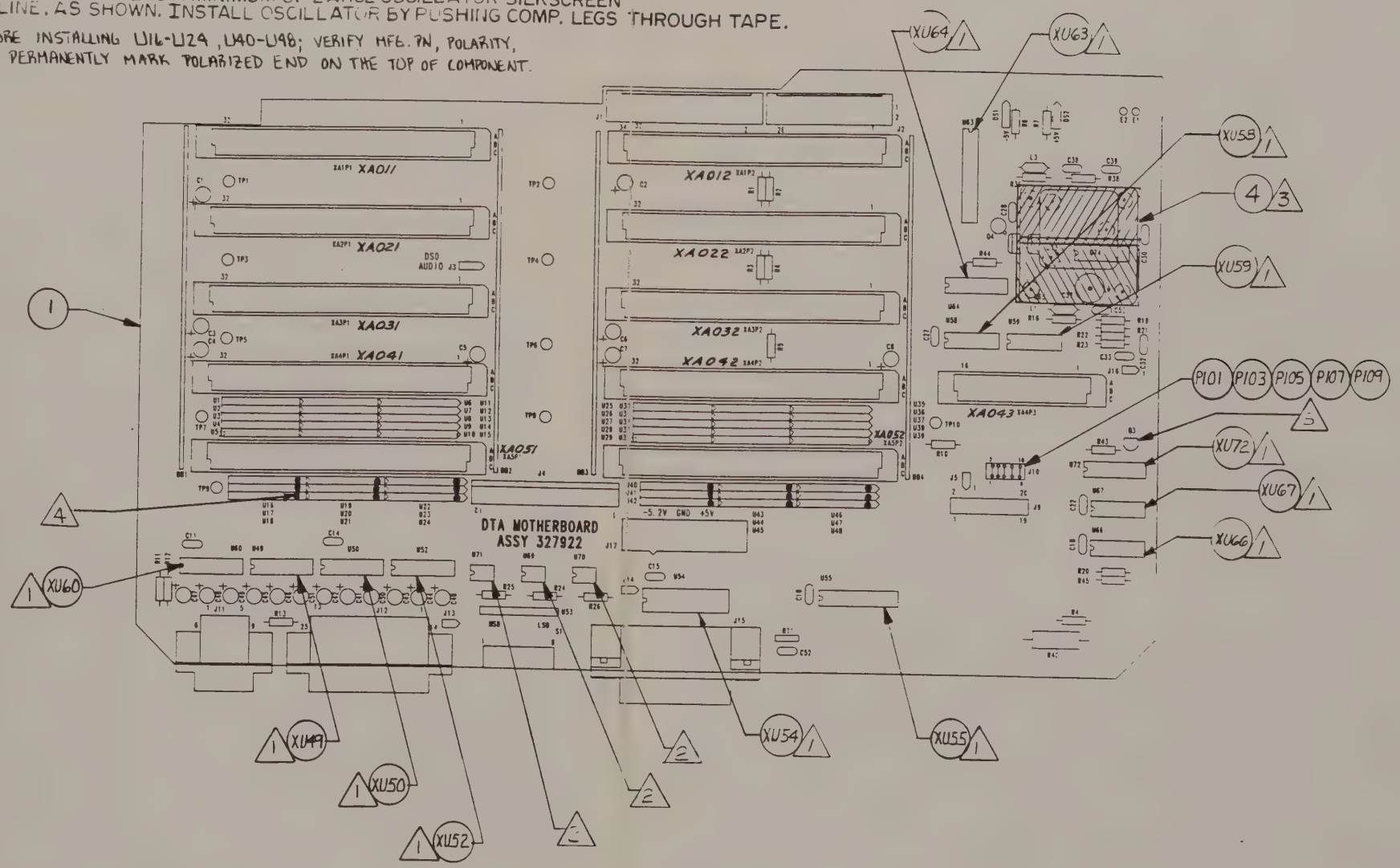


Figure 5.28. CPU PWB Subassembly Schematic (A1/A5/A1) (Sheet 7 of 7)

NOTES:

1. AFTER WAVE SOLDER INSTALL IC INTO SOCKET.
2. BEFORE WAVE SOLDER SPOT MASK IC HOLES.
3. ENSURE TAPE COVERS A MINIMUM OF LARGE OSCILLATOR SILKSCREEN OUTLINE. AS SHOWN. INSTALL OSCILLATOR BY PUSHING COMP. LEGS THROUGH TAPE.
4. BEFORE INSTALLING U16-U24, U40-U98; VERIFY MFG. PN, POLARITY, AND PERMANENTLY MARK POLARIZED END ON THE TOP OF COMPONENT.
5. TEST POINT Q3 IS MOUNTED BETWEEN PINS 2 AND 3. Q3 TOP VIEW



PAL CHART

	ECO NO. 10684	ECO NO.	ECO NO
TOP ASSY - 327922	→		
PWB - 327921	→		
U63 - 307203 U63 0AAC	U63 - 309651 U63 24EA		

Figure 5.29. Mothercard PWB Assembly (A1/A6)

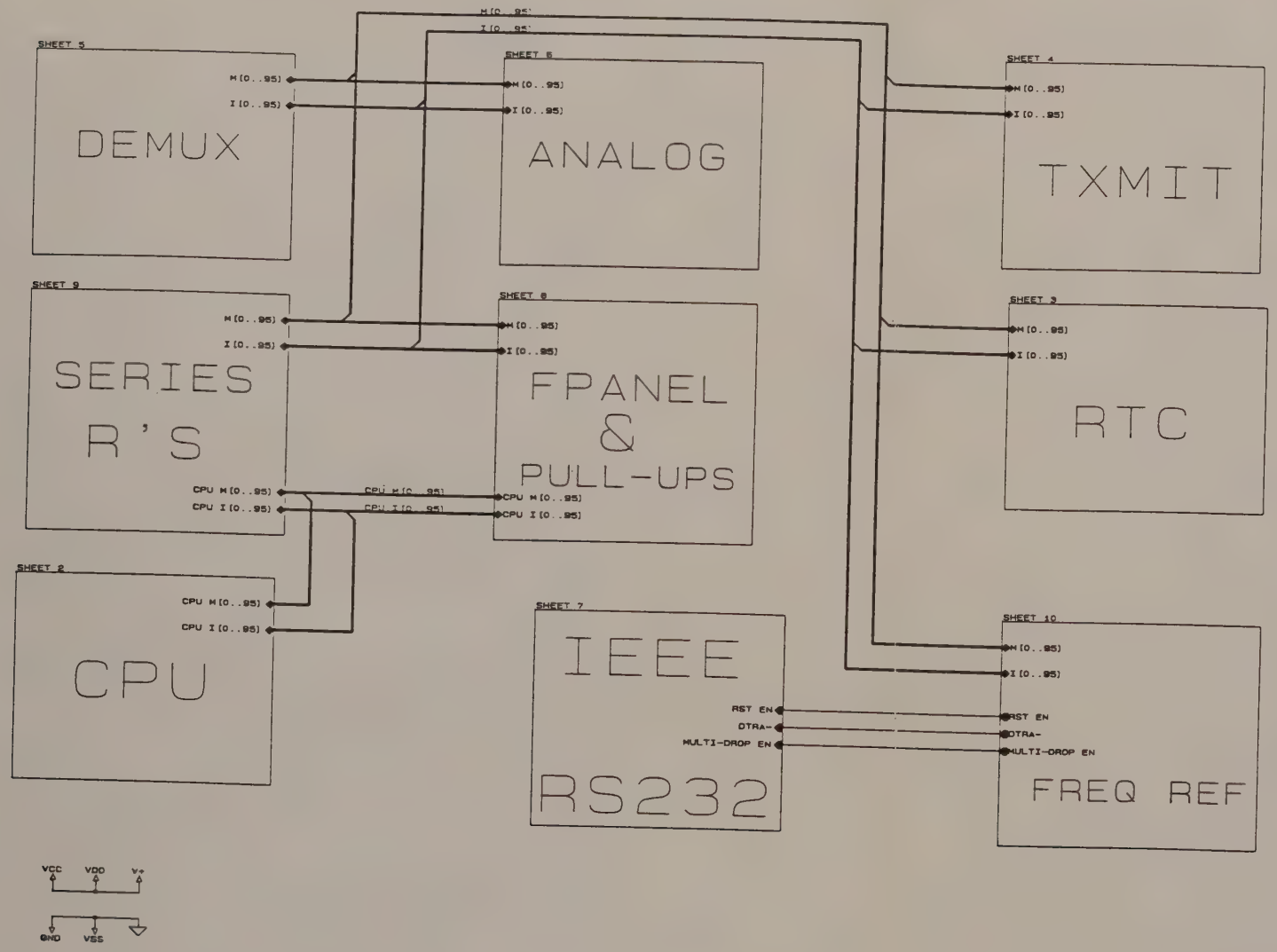


Figure 5.30. Mothercard PWB Assembly Schematic (A1/A6) (Sheet 1 of 10)

CPU BUS

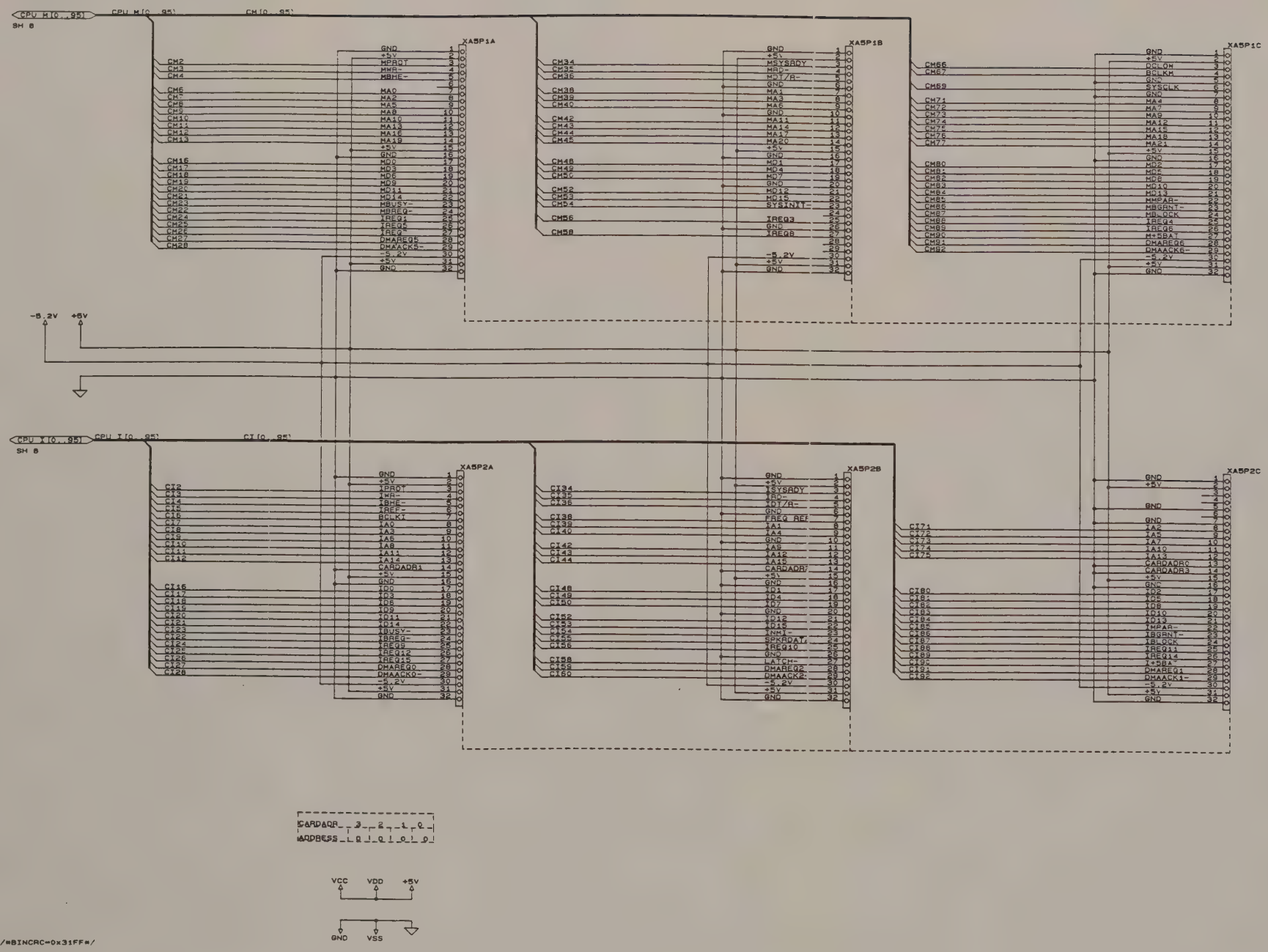


Figure 5.30. Mothercard PWB Assembly Schematic (A1/A6) (Sheet 2 of 10)

RTC

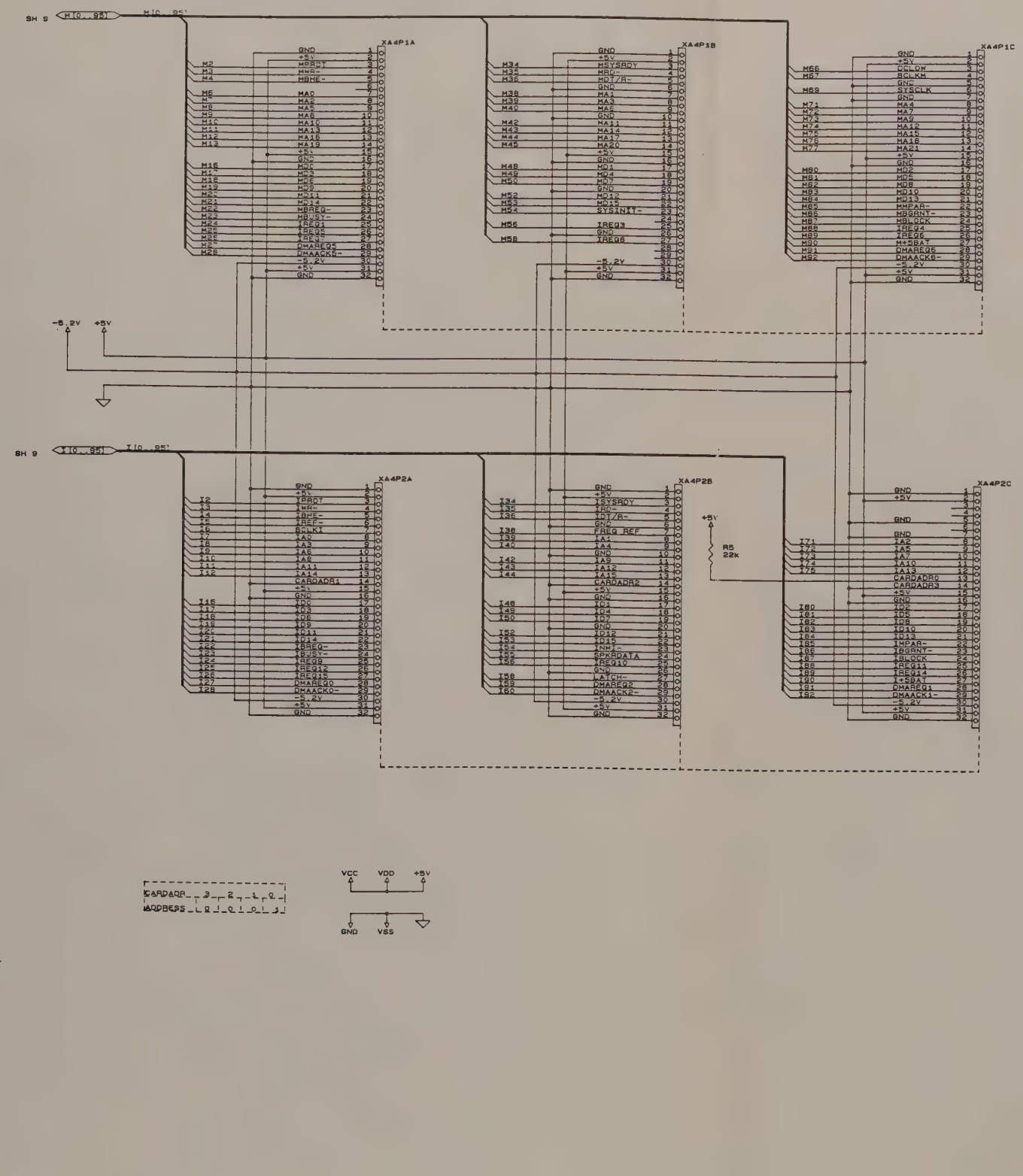
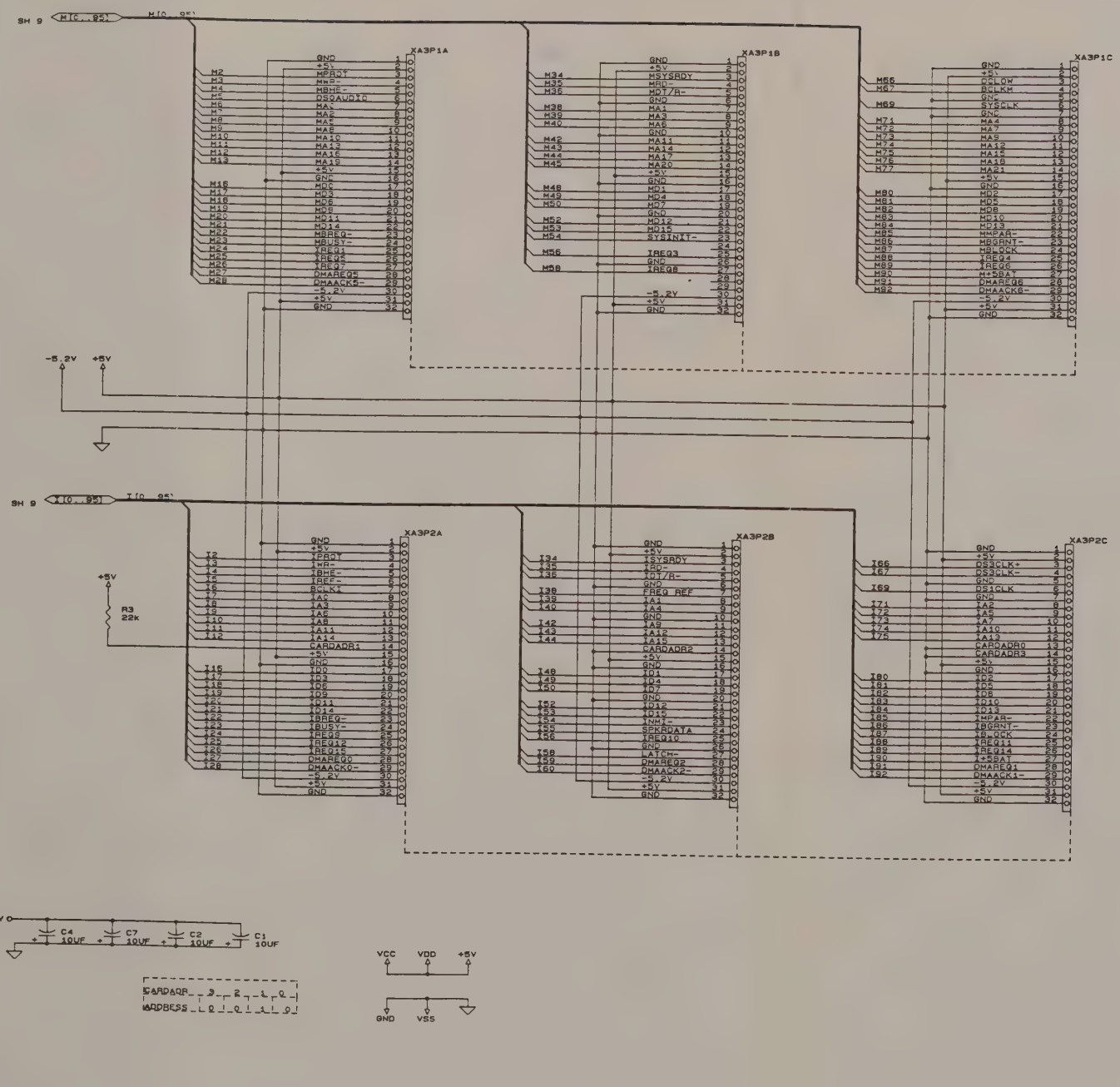


Figure 5.30. Mothercard PWB Assembly Schematic (A1/A6) (Sheet 3 of 10)

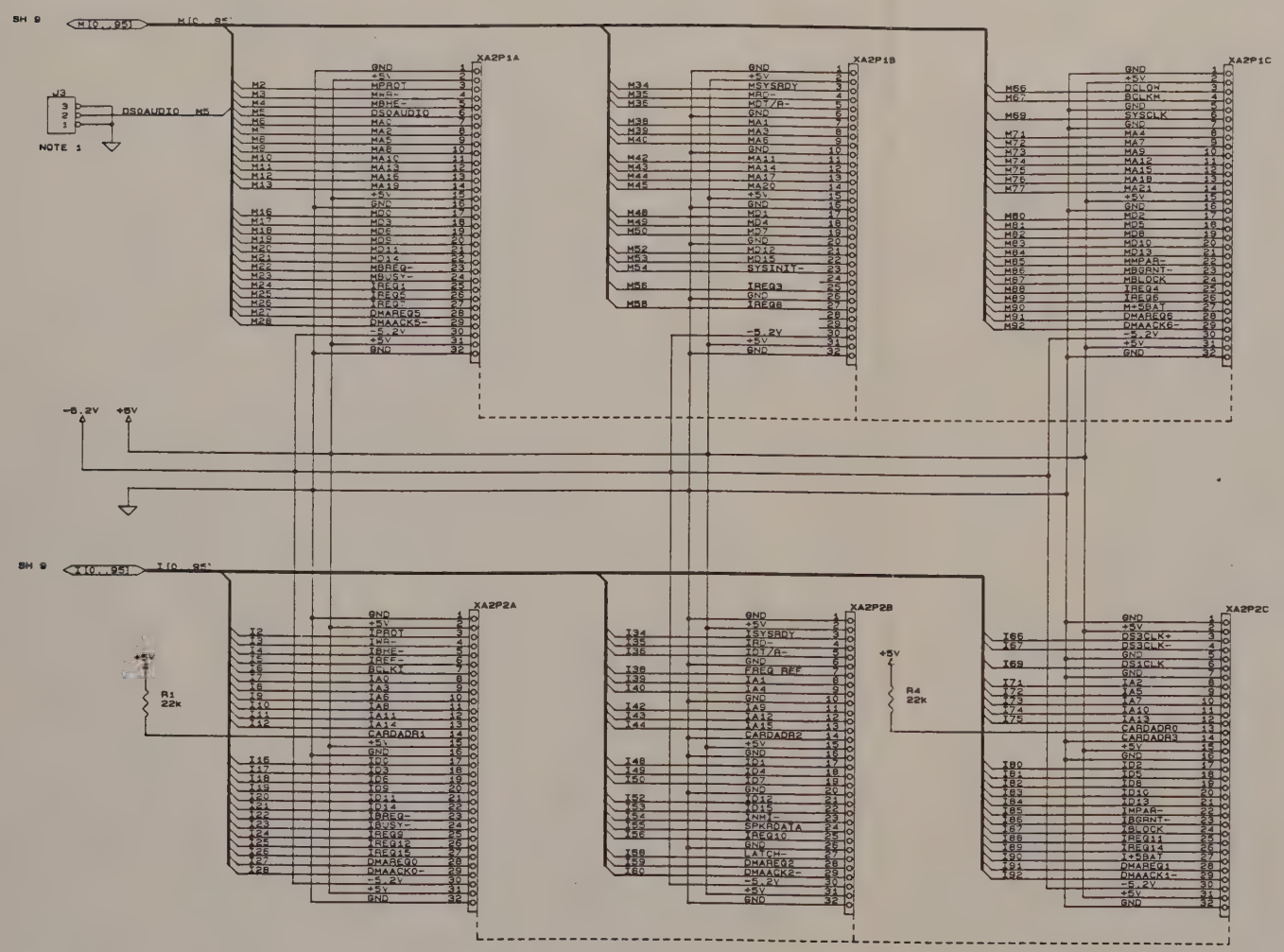
TXMIT



/*BINCRC=0xC106*/

Figure 5.30. Mothercard PWB Assembly Schematic (A1/A6) (Sheet 4 of 10)

DEMUX



/*BINCRC=0x3569*/

Figure 5.30. Mothercard PWB Assembly Schematic (A1/A6) (Sheet 5 of 10)

ANALOG

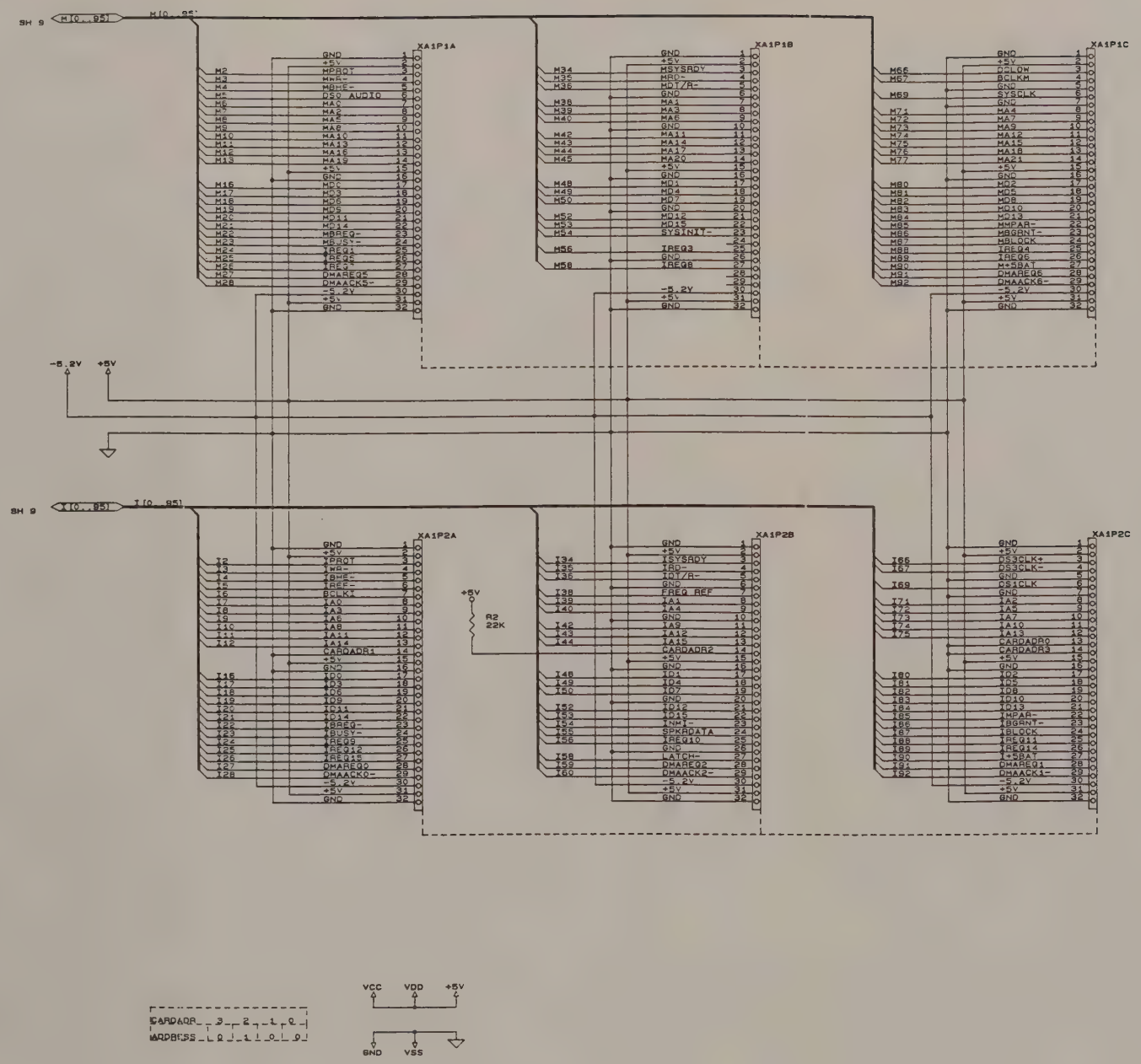


Figure 5.30. Mothercard PWB Assembly Schematic (A1/A6) (Sheet 6 of 10)

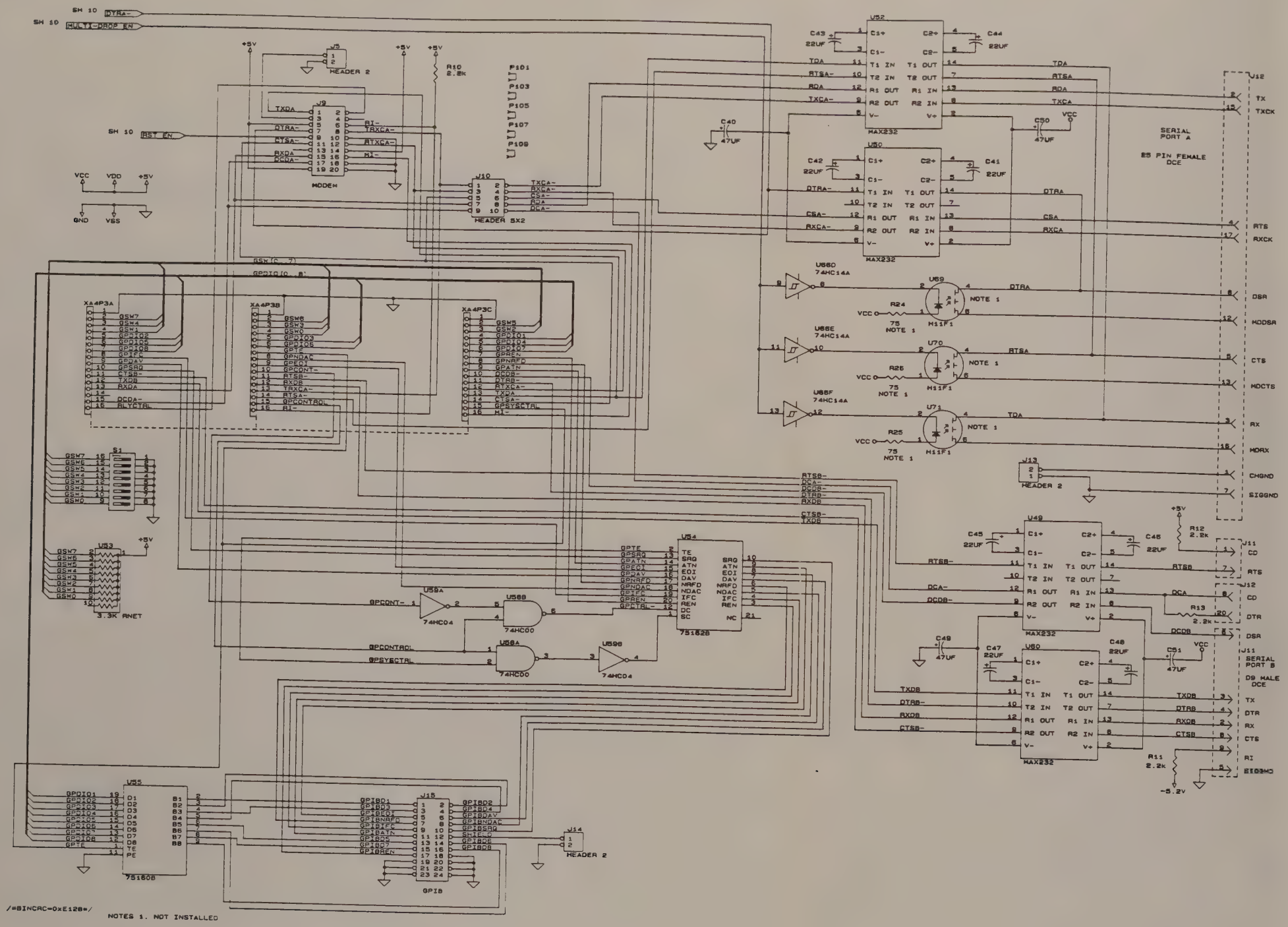


Figure 5.30. Mothercard PWB Assembly Schematic (A1/A6) (Sheet 7 of 10)

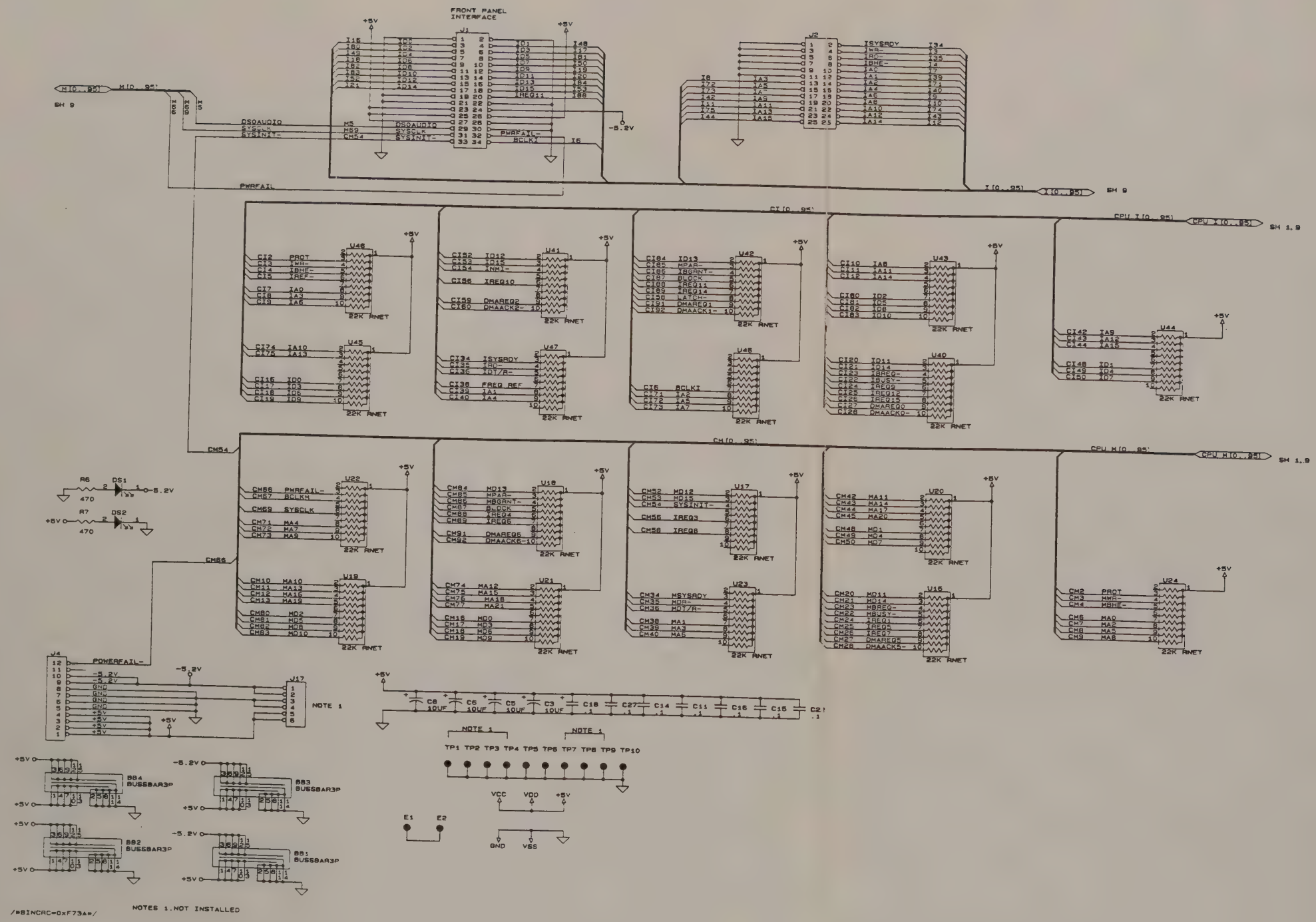
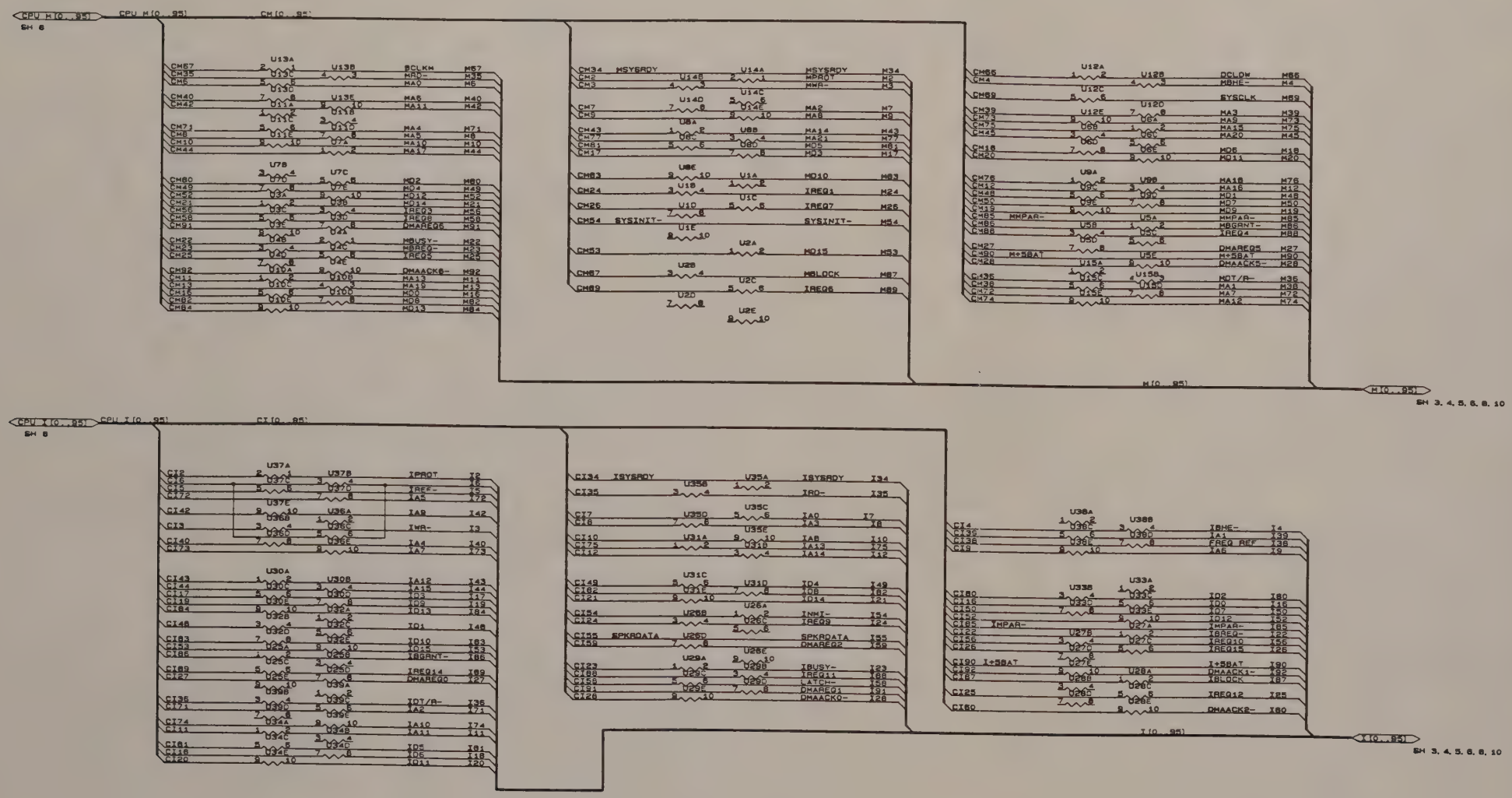


Figure 5.30. Mothercard PWB Assembly Schematic (A1/A6) (Sheet 8 of 10)

SERIES RESISTORS



NOTE

ALL RESISTORS SHOWN ON THIS SHEET ARE 150 OHMS.

/*BINCRC=0x578A*/

Figure 5.30. Motnercard PWB Assembly Schematic (A1/A6) (Sheet 9 of 10)

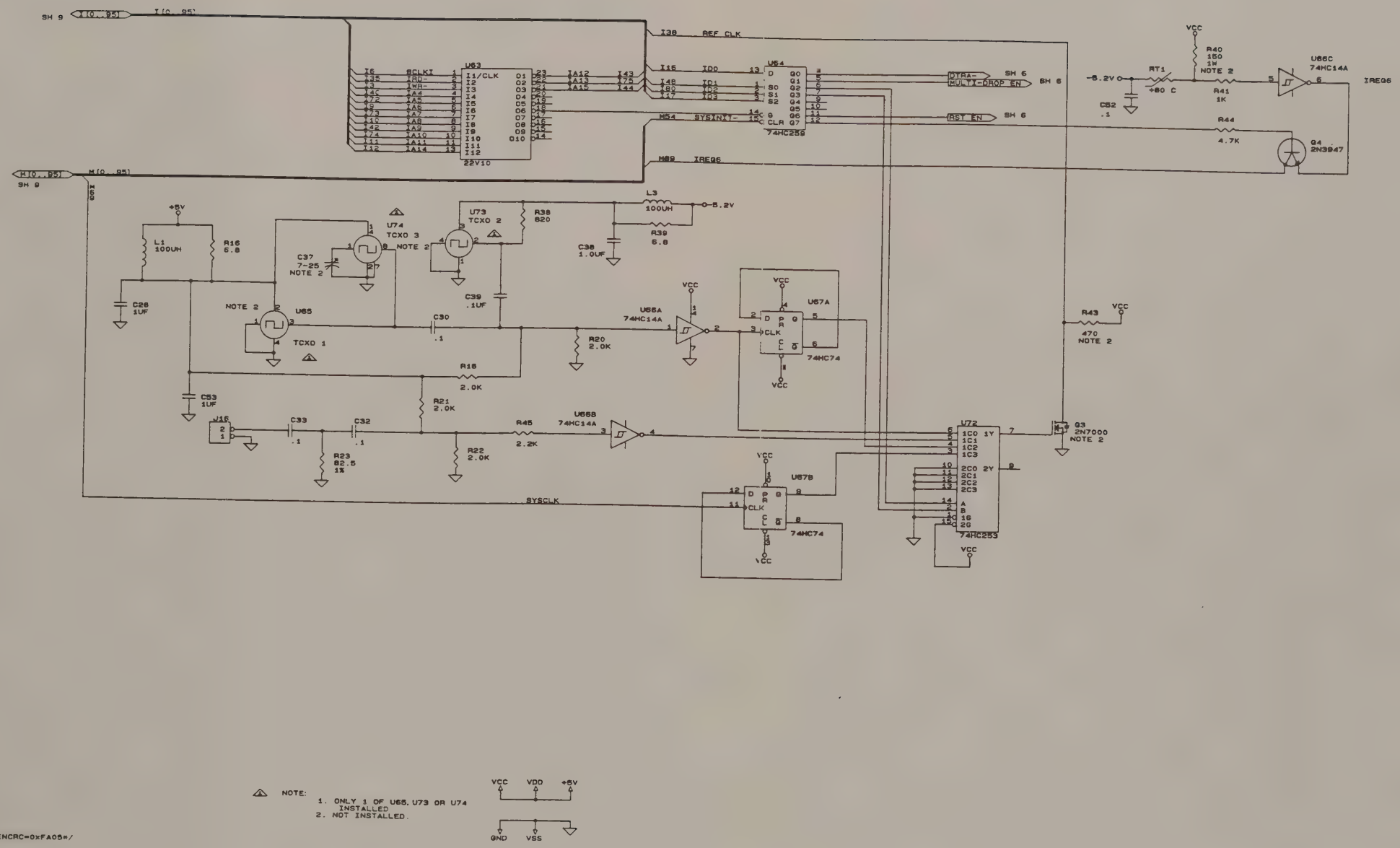
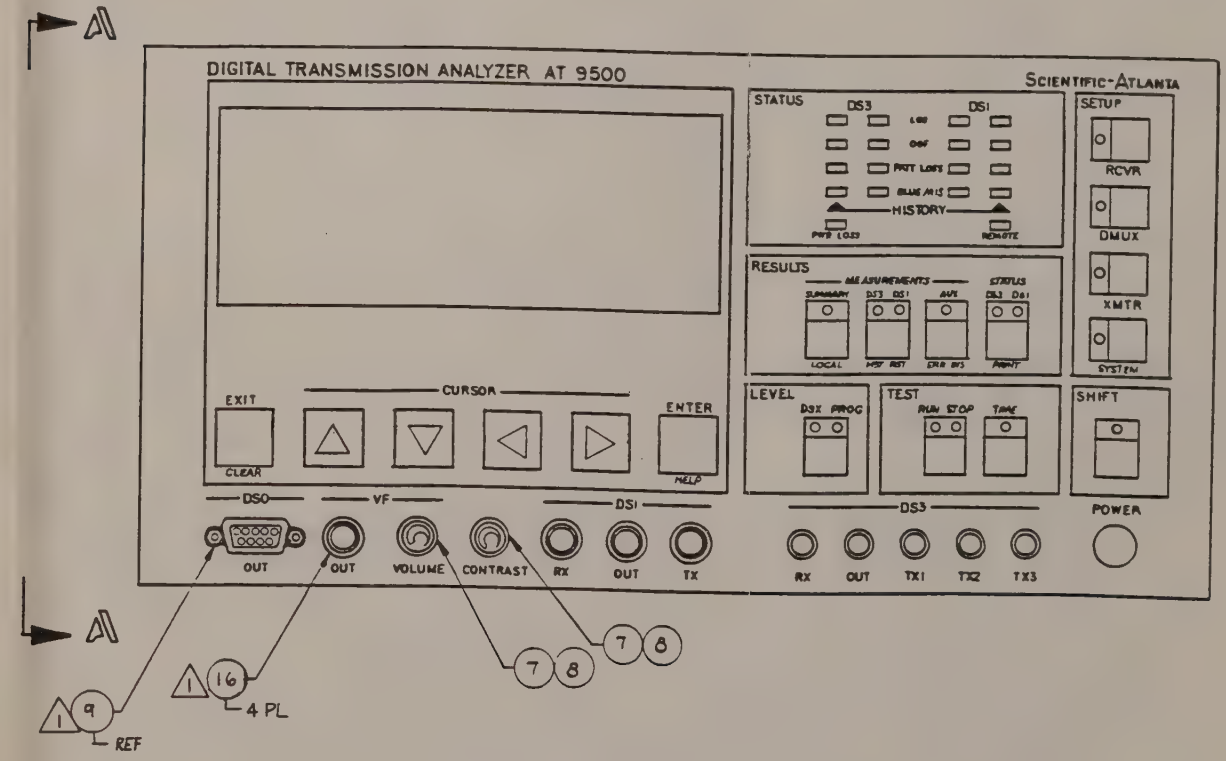
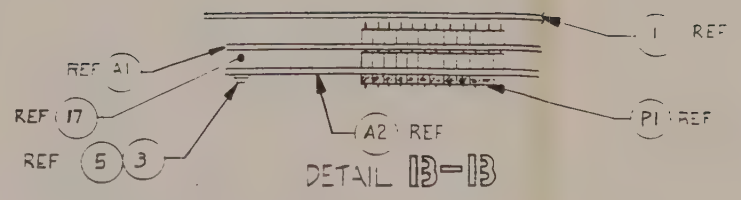


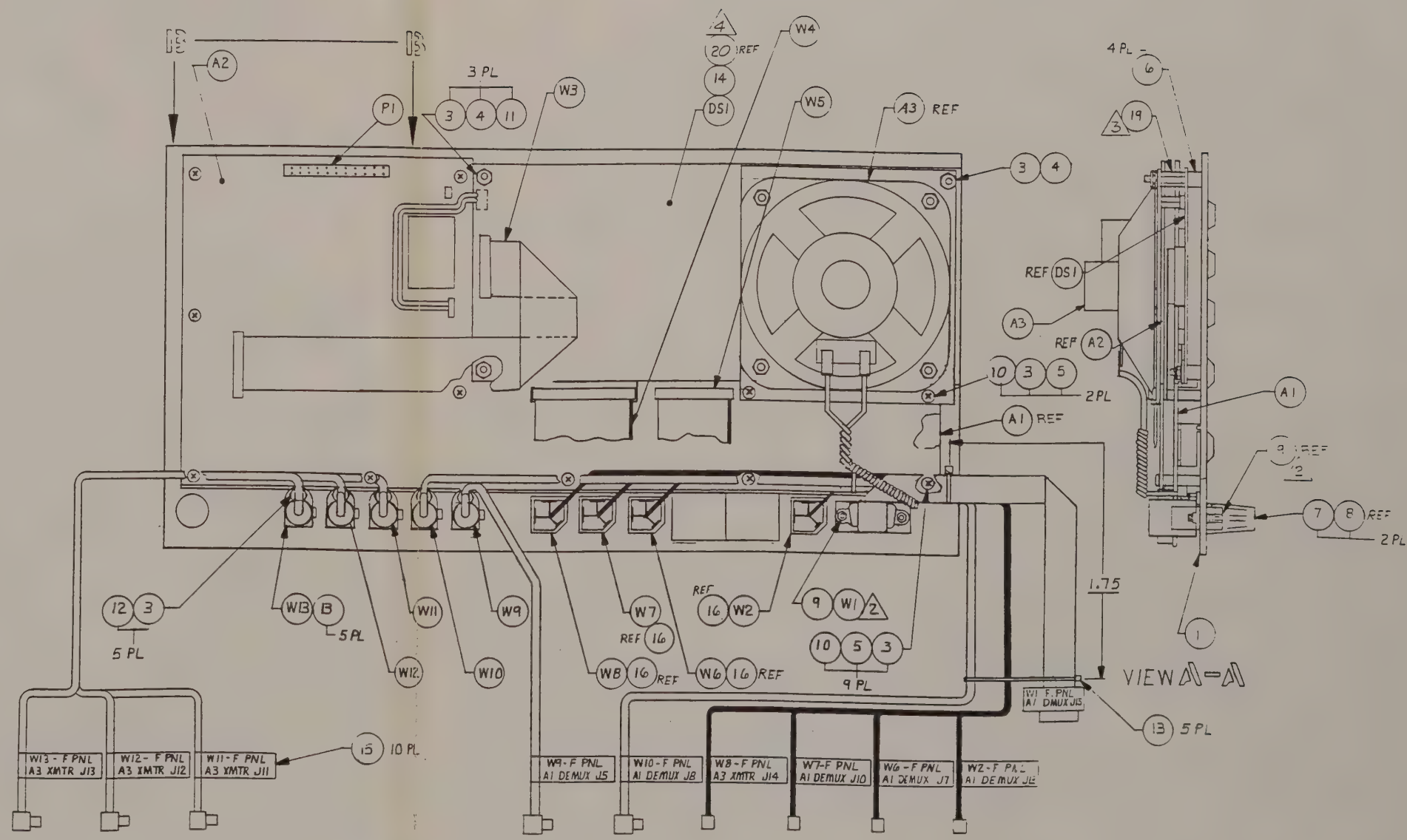
Figure 5.30. Mothercard PWB Assembly Schematic (A1/A6) (Sheet 10 of 10)



1 BEFORE TIGHTENING FRONT PANEL TO SUB-PANEL ENSURE ALL SWITCHES HAVE CLEARANCE AROUND PLASTIC CAPS AND HAVE FREE MOVEMENT.

Figure 5.31. **Front-panel Assembly (A1/A7) (Sheet 1 of 2)**





2 INSTALL (2) F. WASHERS PROVIDED WITH JACK SOCKET KIT TO ENSURE JACK SOCKETS ARE FLUSH WITH CONNECTOR FACE

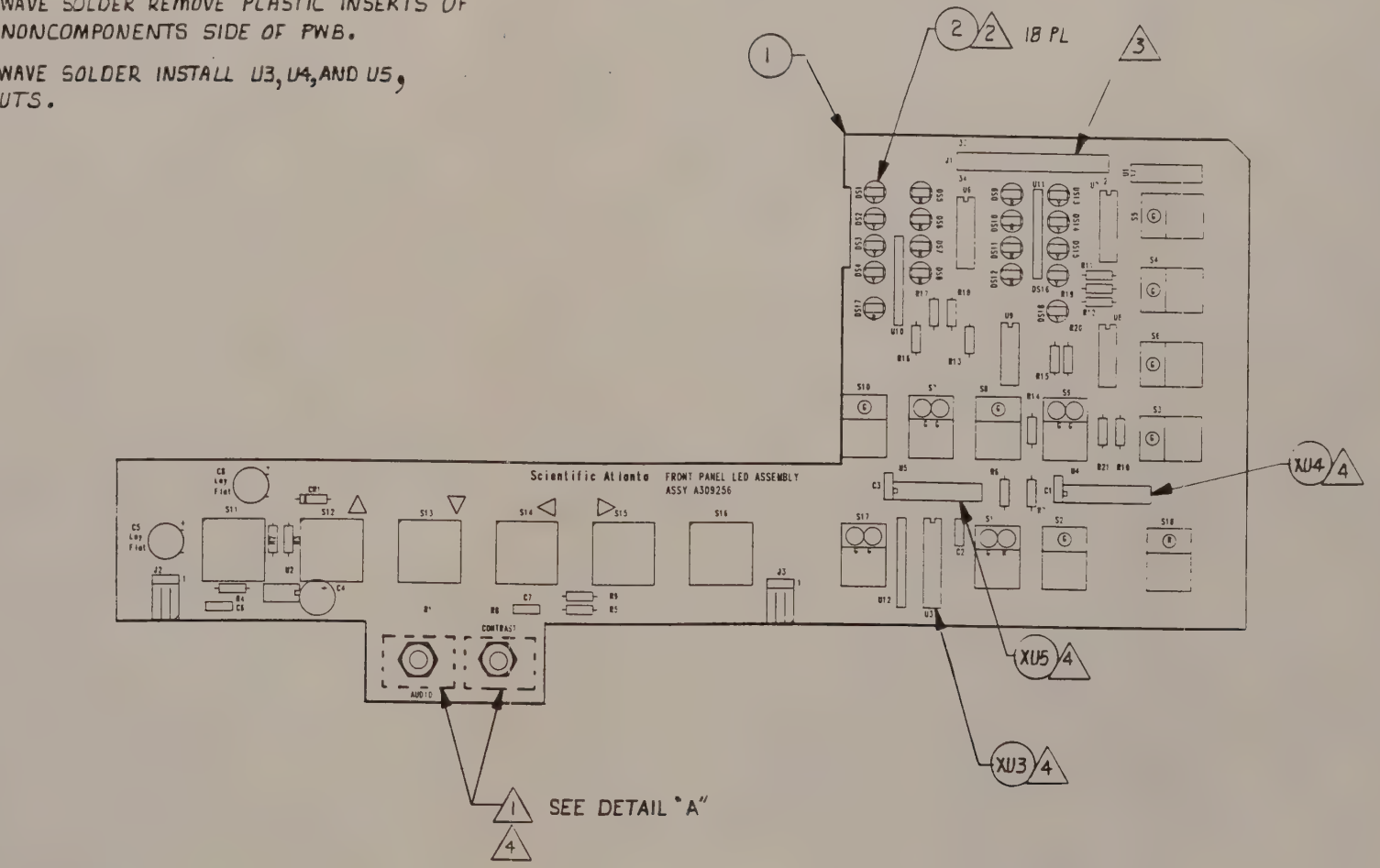
3 DO NOT INSTALL ANY HARDWARE BETWEEN DISPLAY AND SPEAKER BRACKET. (ONLY ITEM 19)

Figure 5.31. Front-panel Assembly (A1/A7) (Sheet 2 of 2)

309103
351052Z

NOTES:

1. AFTER WAVE SOLDER FORM TERMINALS OF R1 AND R8 PER DETAIL "A" AND INSTALL FROM NONCOMPONENT SIDE OF PWB.
2. INSTALL ITEM 2 UNDER DS1 THRU DS18.
3. AFTER WAVE SOLDER REMOVE PLASTIC INSERTS OF J1 ON NONCOMPONENTS SIDE OF PWB.
4. AFTER WAVE SOLDER INSTALL U3, U4, AND U5, AND NUTS.



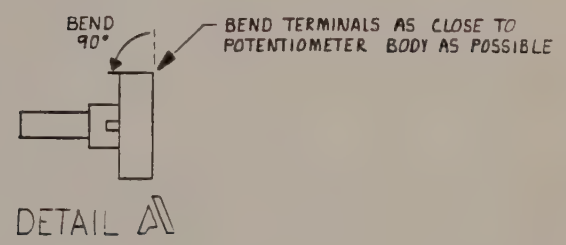


Figure 5.32. Front-panel LED PWB Assembly (A1/A7/A1)

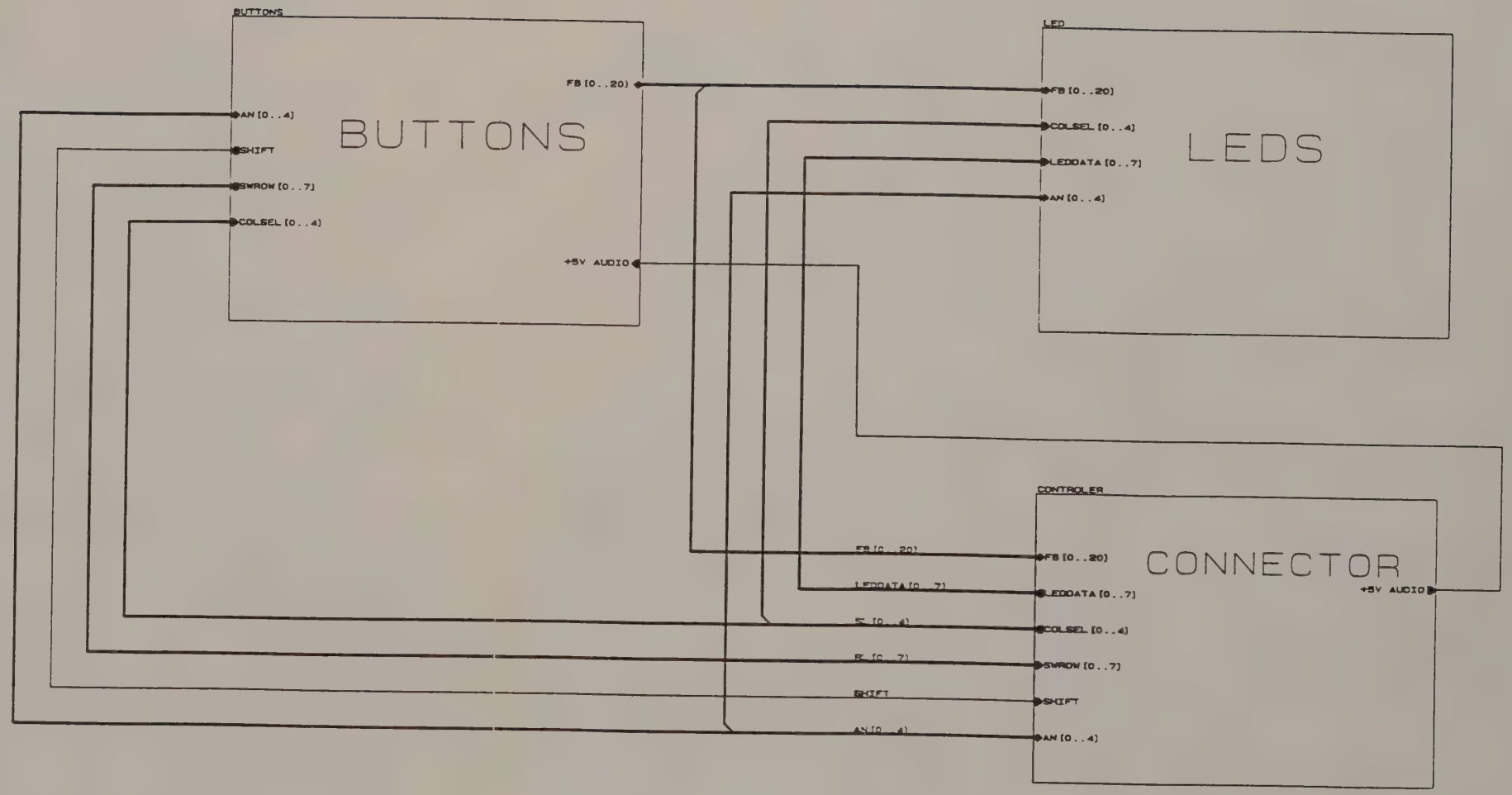


Figure 5.33. **Front-panel LED PWB Assembly Schematic (A1/A7/A1) (Sheet 1 of 4)**

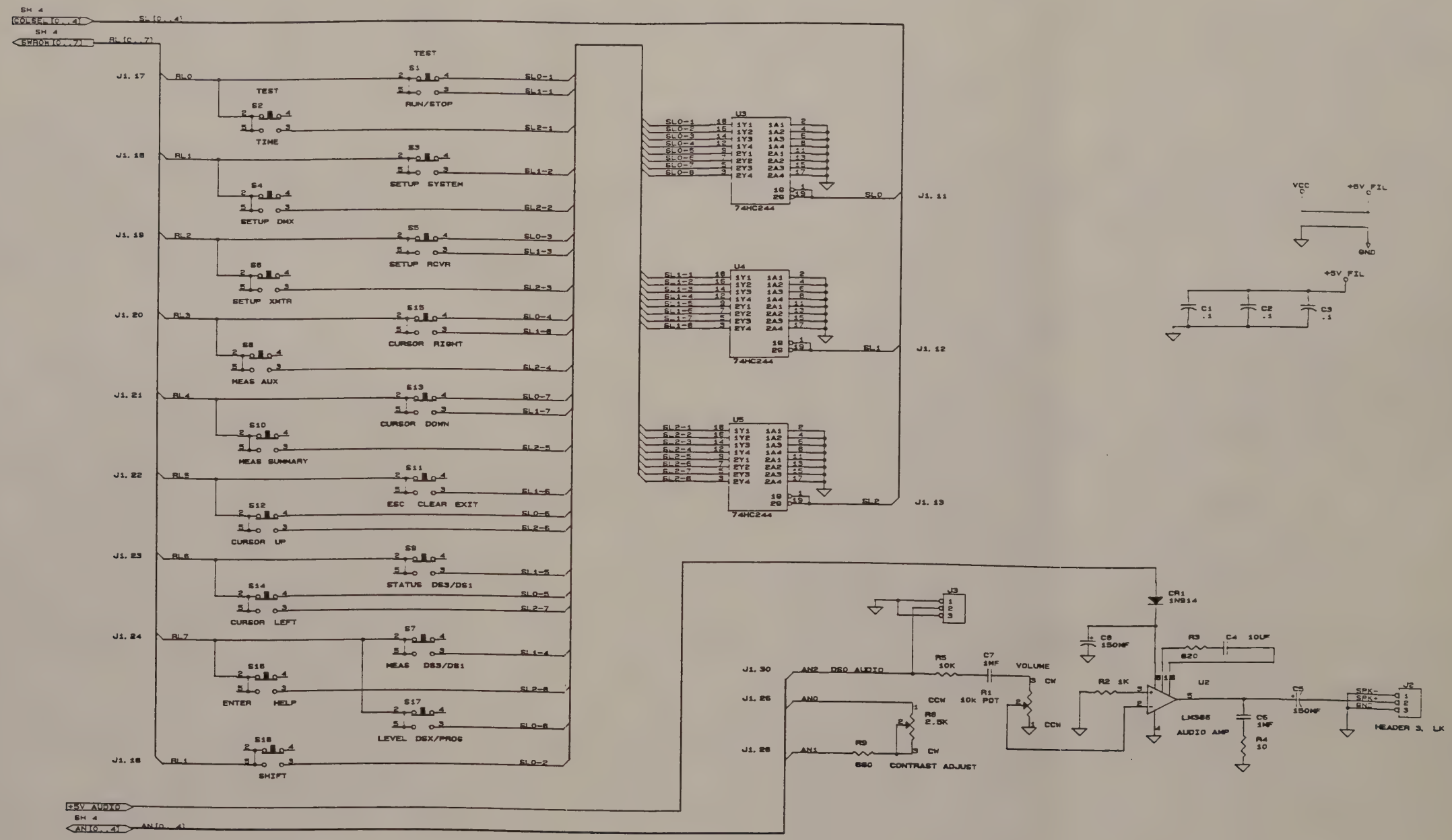


Figure 5.33. **Front-panel LED PWB Assembly Schematic (A1/A7/A1) (Sheet 2 of 4)**

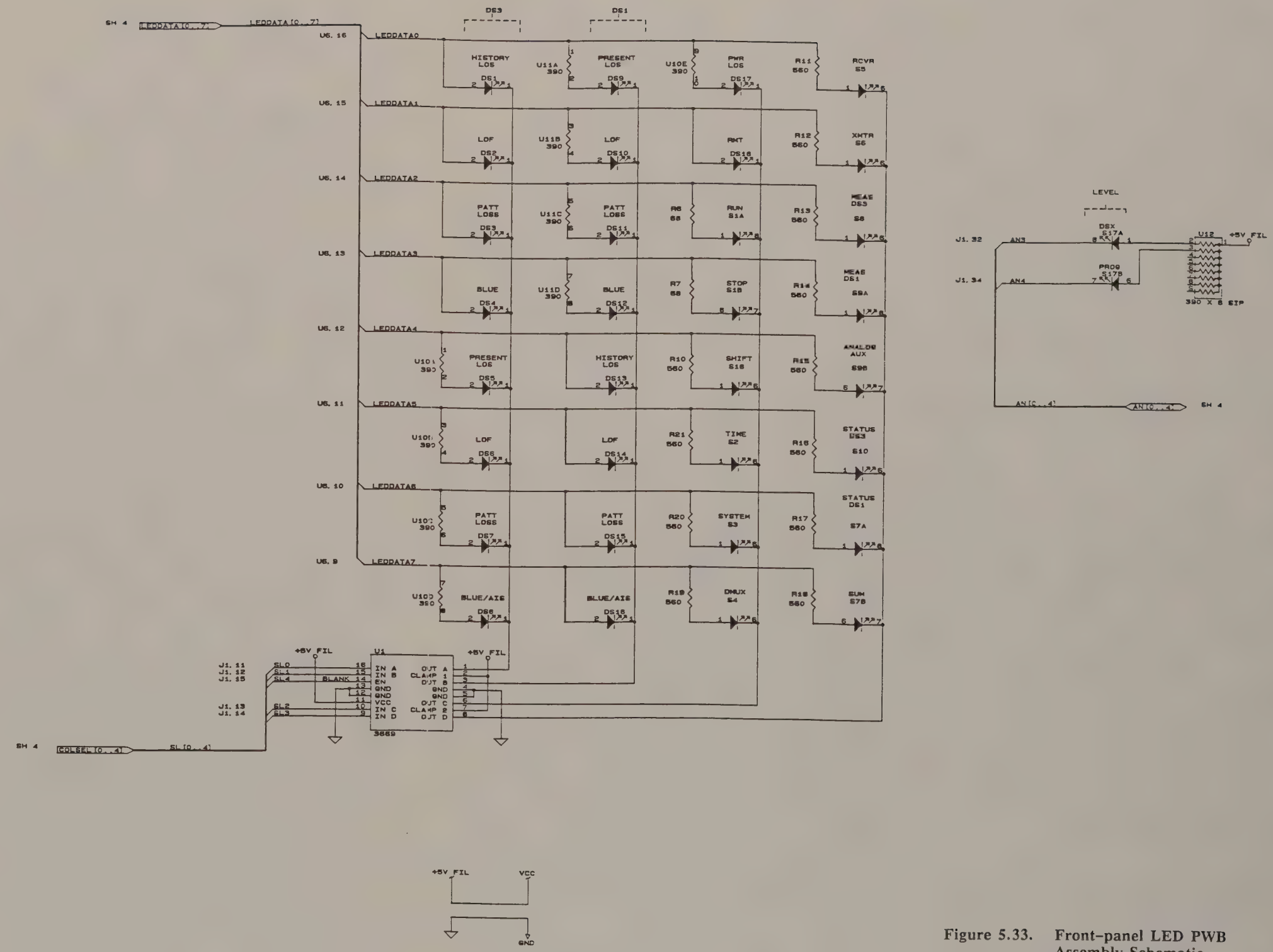


Figure 5.33. Front-panel LED PWB Assembly Schematic (A1/A7/A1) (Sheet 3 of 4)

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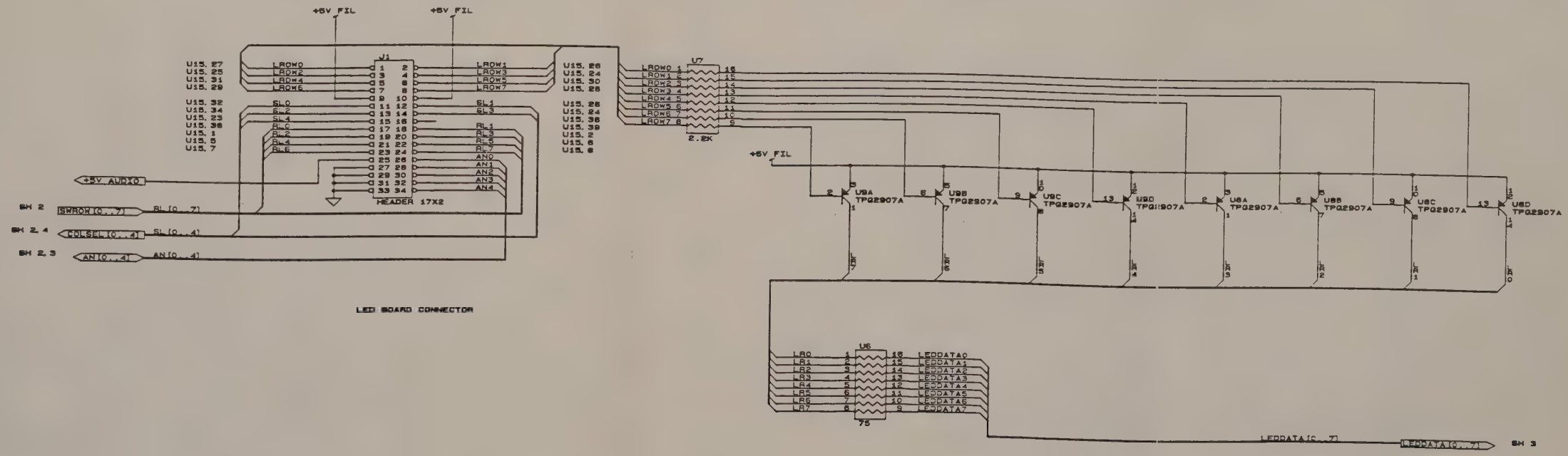
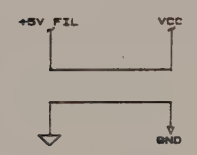
351052Z



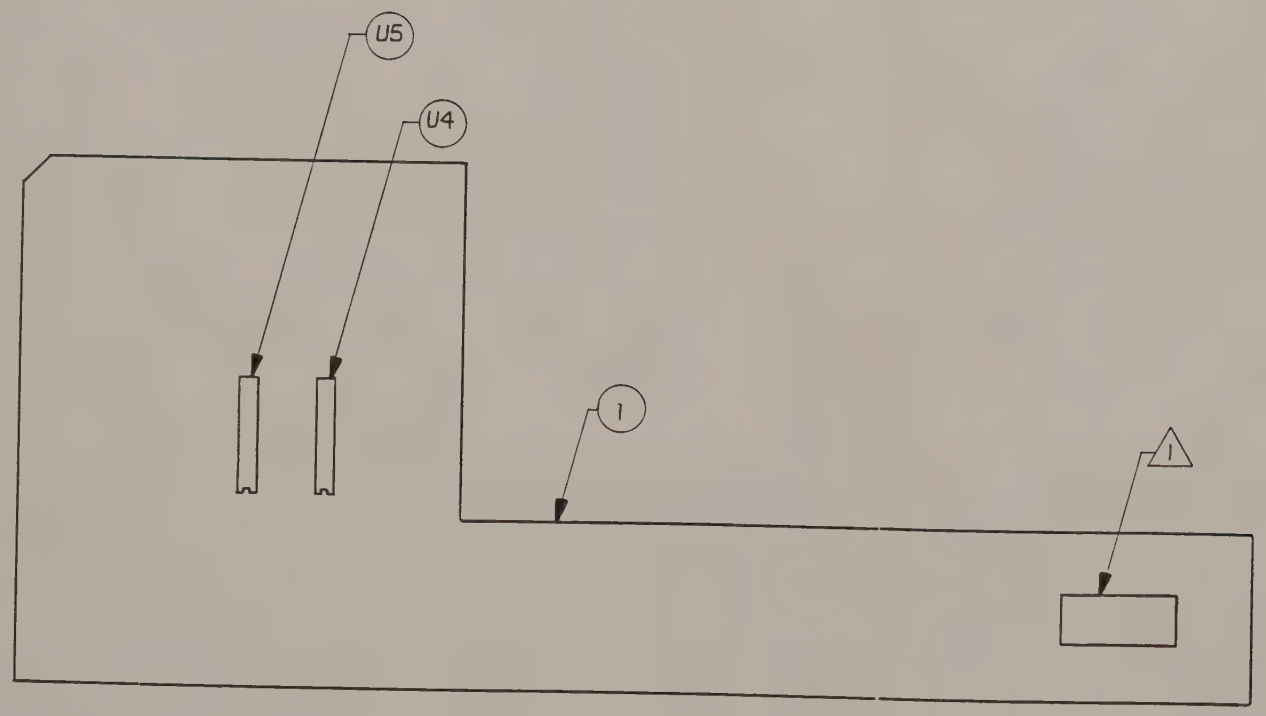


309254
351052Z

Figure 5.33. Front-panel LED PWB Assembly Schematic (A1/A7/A1) (Sheet 4 of 4)

NOTES:

1. APPLY NEW ASSEMBLY LABEL 306244.



EPROM AND PAL CHART			
	ECO NO.	ECO NO.	ECO NO.
TOP ASSY: 306244			
SUB ASSY: 309259			
PWB: 309258			
U4 - 309144 U4 7855			
U5 - 309145 U5 7ACD			

Figure 5.34. Front-panel Bus PWB Assembly (A1/A7/A2)

NOTES:

1. AFTER WAVE SOLDER INSTALL ITEM 3.
2. AFTER WAVE SOLDER REMOVE PLASTIC INSERTS OF J4 ON NONCOMPONENT SIDE OF PWB.
3. AFTER WAVE SOLDER INSTALL U1, U2, U3, U6, U15, U16.
4. U4 AND U5 INSTALLED ON NEXT ASSY.

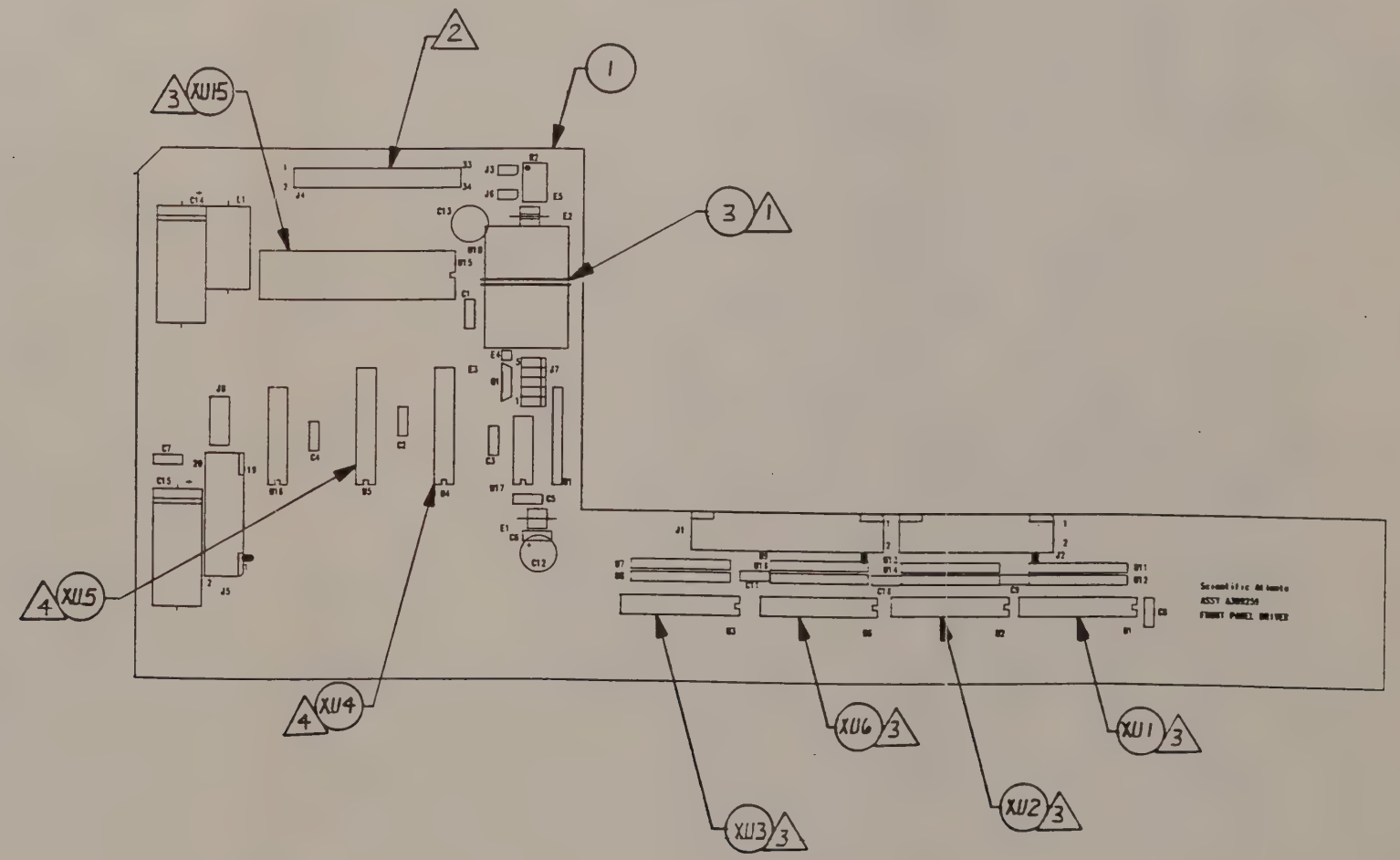


Figure 5.35. Front-panel Bus PWB Subassembly (A1/A7/A2/A1)

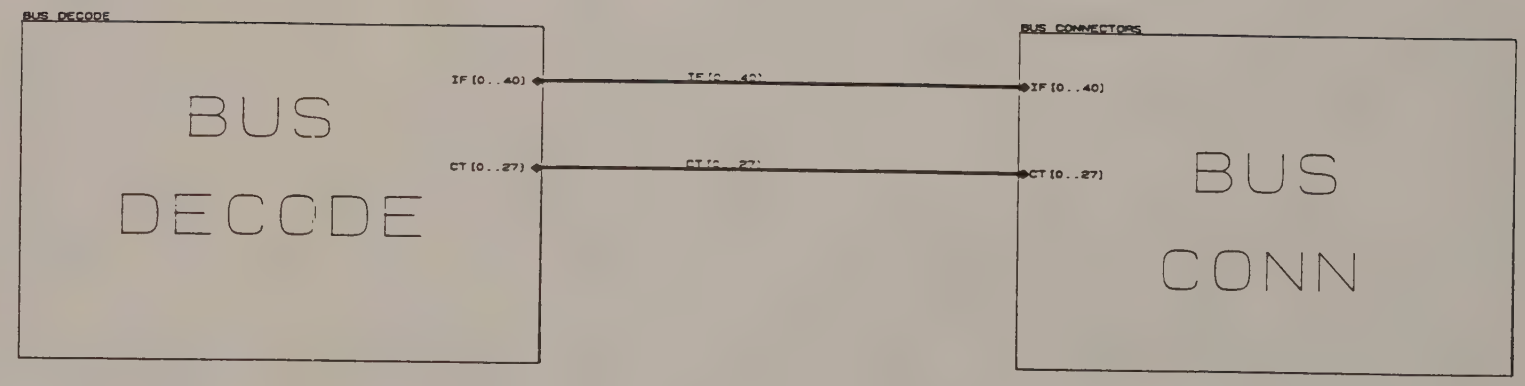


Figure 5.36. Front-panel Bus PWB Subassembly Schematic (A1/A7/A2/A1) (Sheet 1 of 3)

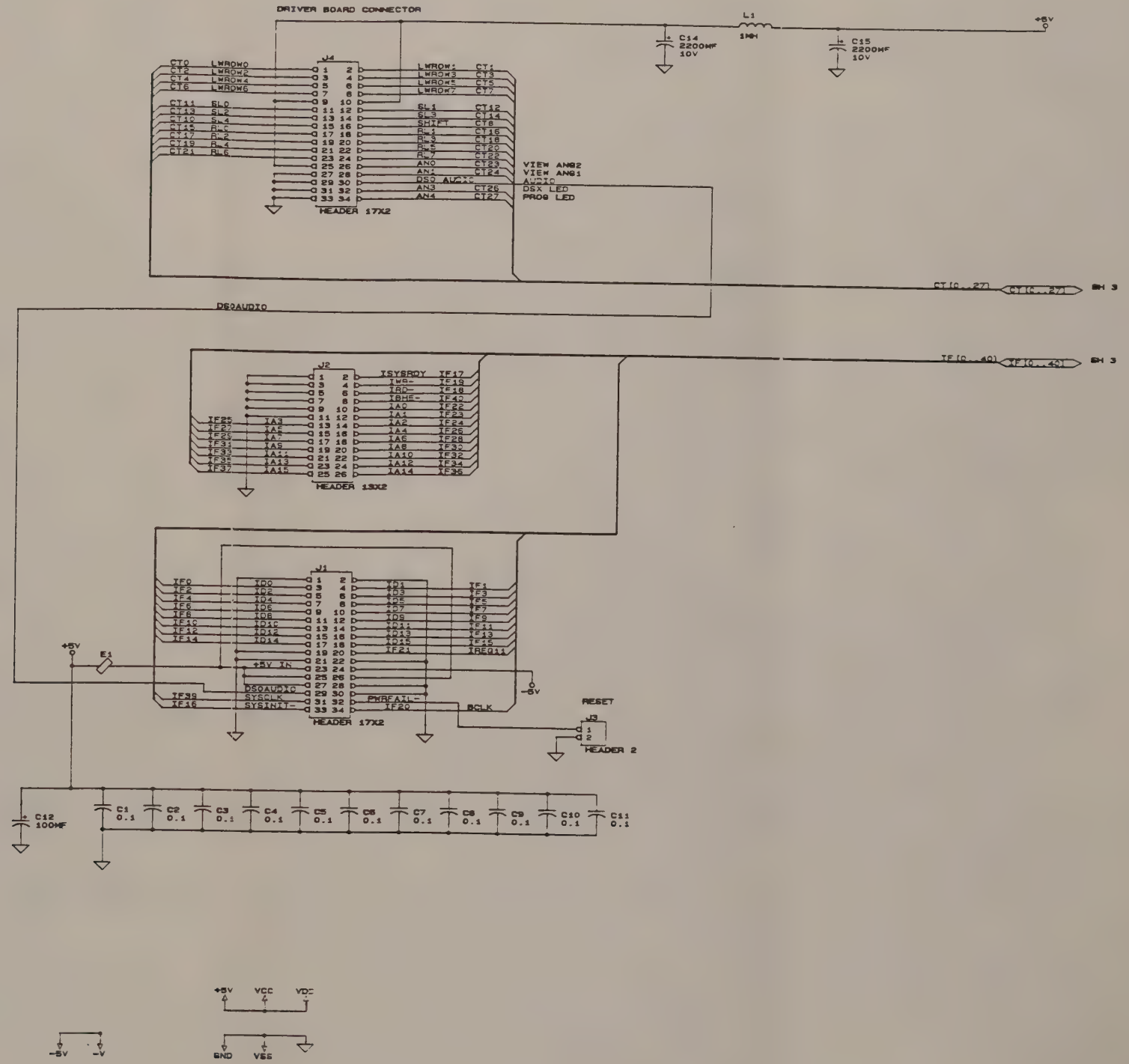


Figure 5.36. Front-panel Bus PWB Subassembly Schematic (A1/A7/A2/A1) (Sheet 2 of 3)

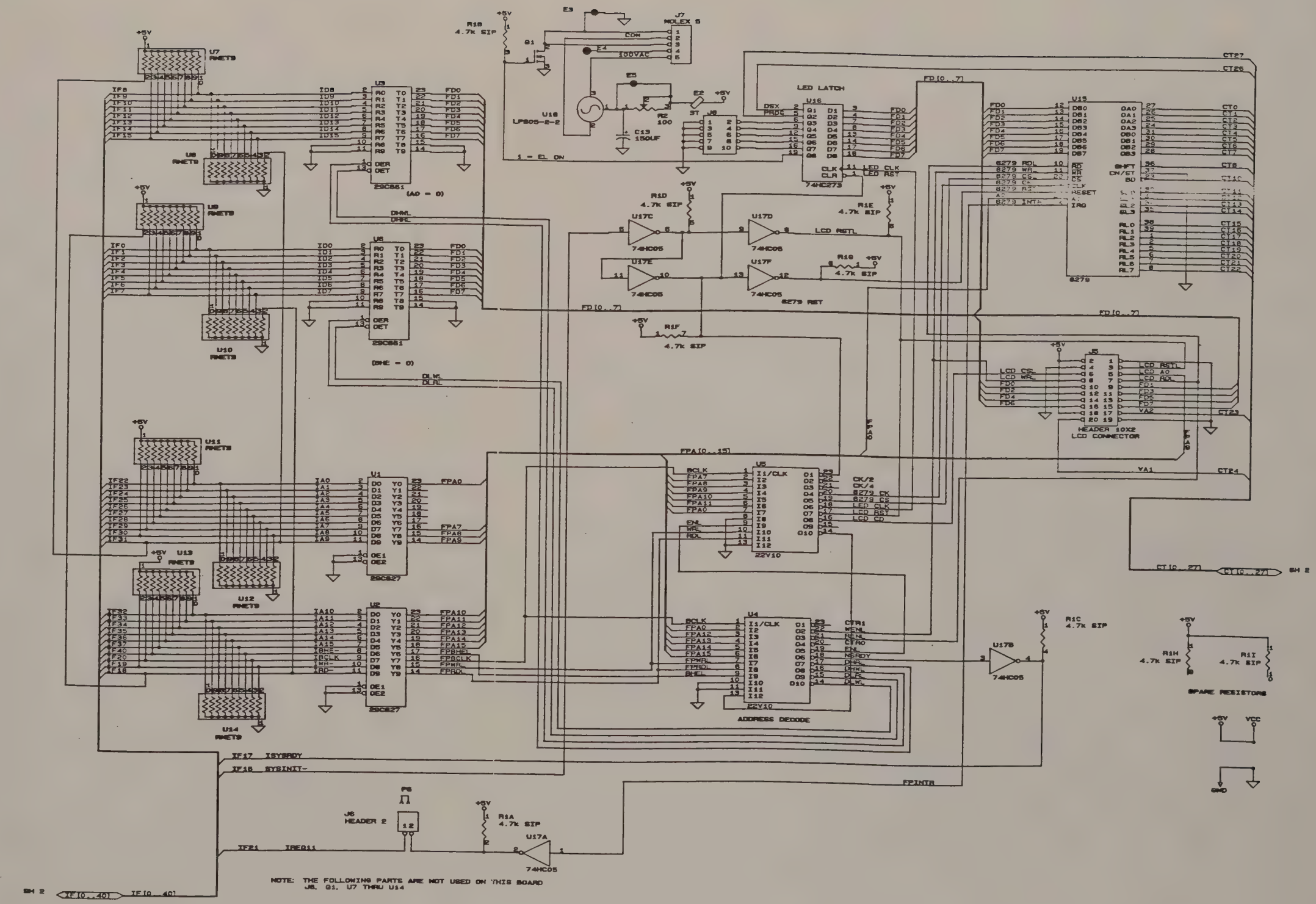
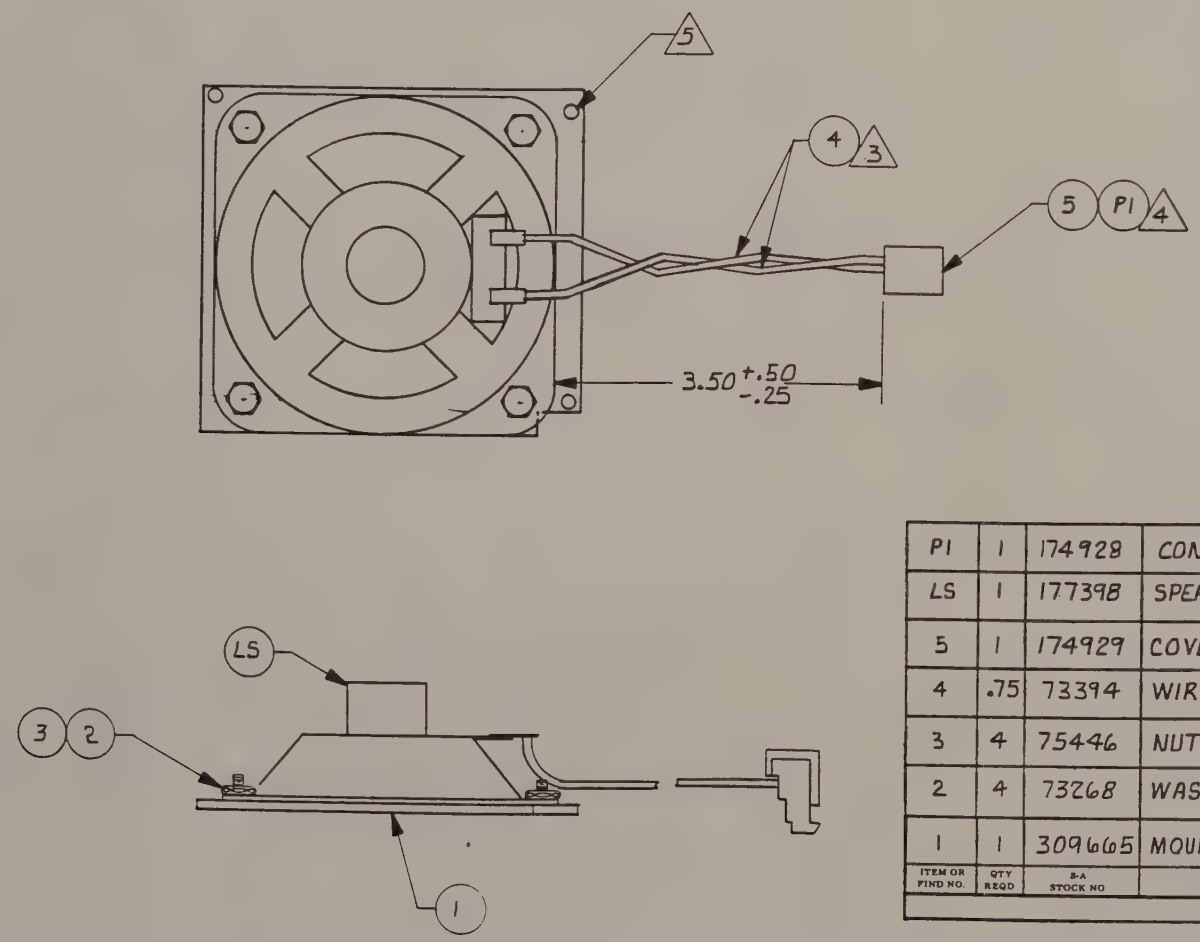


Figure 5.36. Front-panel Bus PWB Subassembly Schematic (A1/A7/A2/A1) (Sheet 3 of 3)

309257
351052Z

NOTES:

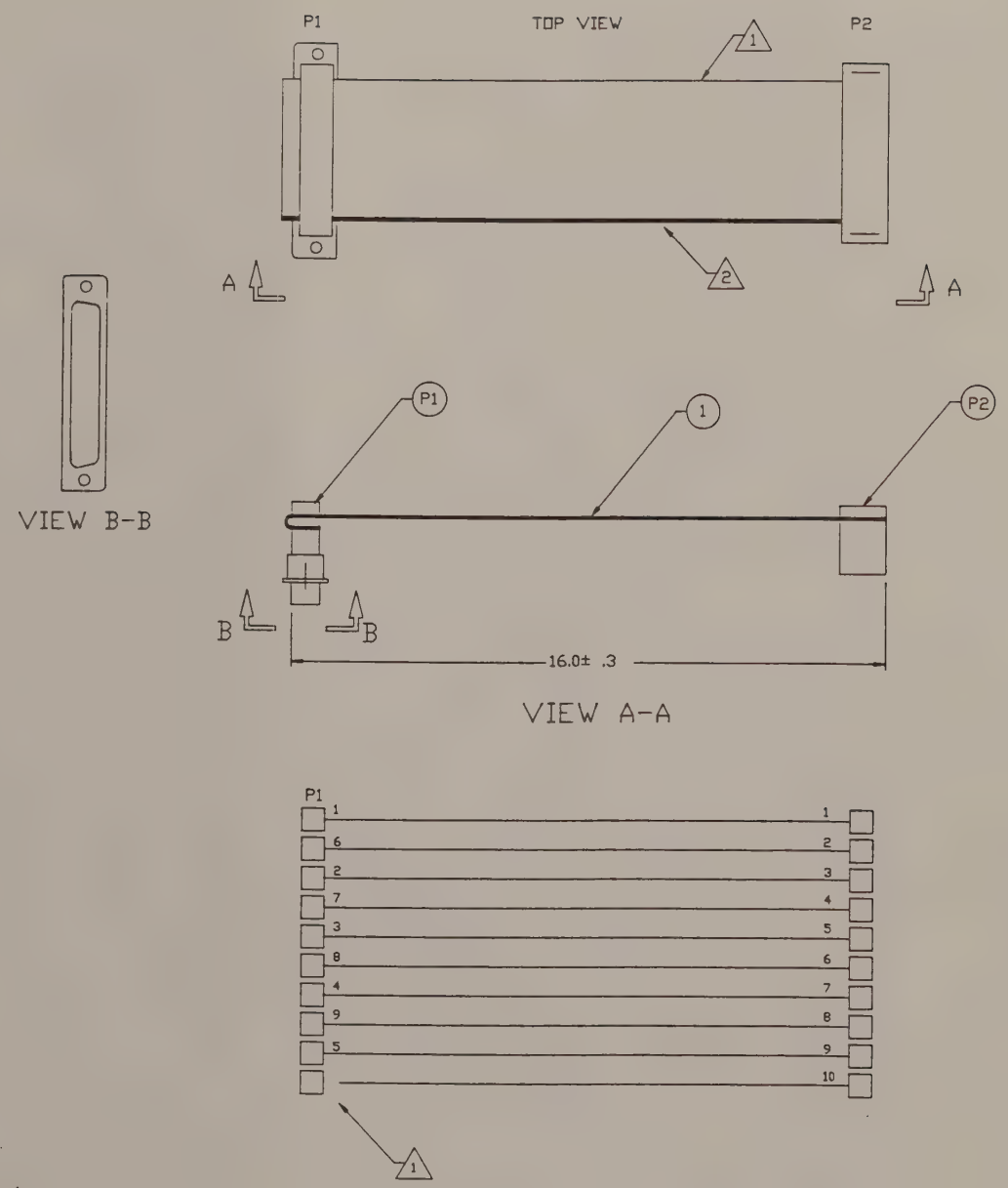
1. APPLY WIRES FROM THE UNDERSIDE OF TABS.
2. APPLY WIRES TO PINS 1 AND 2 IN ITEM P1.
3. TWIST WIRES AT AFTER ASSEMBLY 1.5 TURNS PER INCH.
4. POLARITY OF WIRES FROM LS TO P1 DOES NOT MATTER.
5. NOTE POSITION AND OFFSET OF BRACKET MOUNTING HOLES.



ITEM OR FIND NO.	QTY REQD	S-A STOCK NO	NOMENCLATURE OR DESCRIPTION	MATL SPEC AND SIZE OR COMPONENT VALUE	IDENTIFYING OR PART NO	FSCM NO
P1	1	174928	CONNECTOR		CE100F22-3	PANDUIT
LS	1	177398	SPEAKER	3.5 SQUARE	3A05	QN
5	1	174929	COVER, CONN		EC100F-3	PANDUIT
4	.75	73394	WIRE	22 AWG	MIL-W-16878D	THM
3	4	75446	NUT, HEX	6-32 UNC	MS35649-264	
2	4	73268	WASHER, LOCK	NO.6	ANSI B 18.21.1	
1	1	309665	MOUNT		309665	

PARTS LIST

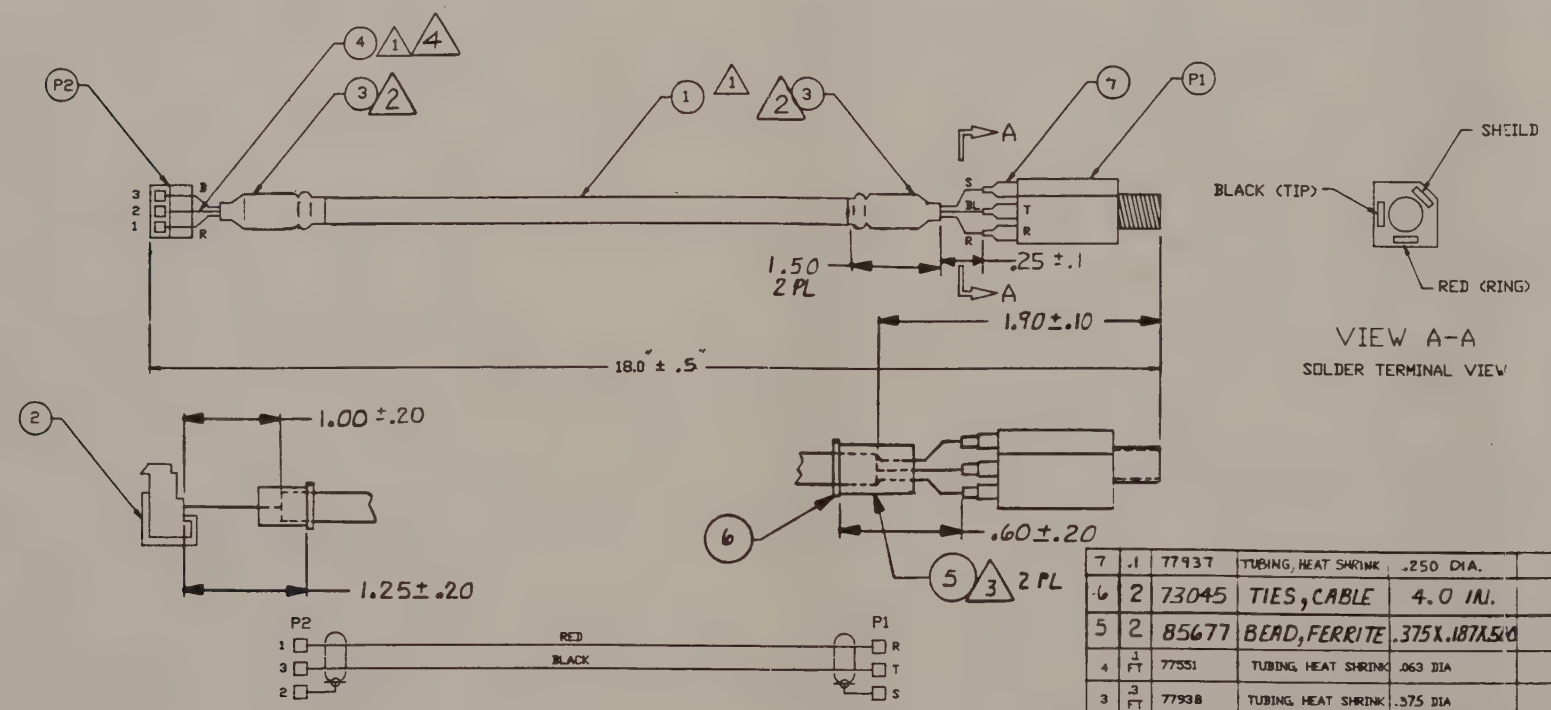
Figure 5.37. Speaker Assembly (A1/A7/A3)



ITEM	QTY	S.A. STK NO.	DESCRIPTION	SPEC AND SIZE OR VALUE	IDENTIFYING NO.
PARTS LIST					
1	1.25 FT	85130	CBL, FLAT RIBBON	10 COND 28 AWG	MMM3365/10
P2	1	85048	CONN, FLAT CABLE	10 PIN FEM	MMM 3473-6000
P1	1	177179	CONN, FLAT CABLE	D 9 PIN FEM BLK INSERT	BERG 66170-109

Figure 5.38. DS0 Cable Assembly (A1/A7/W1)

327964
351052Z

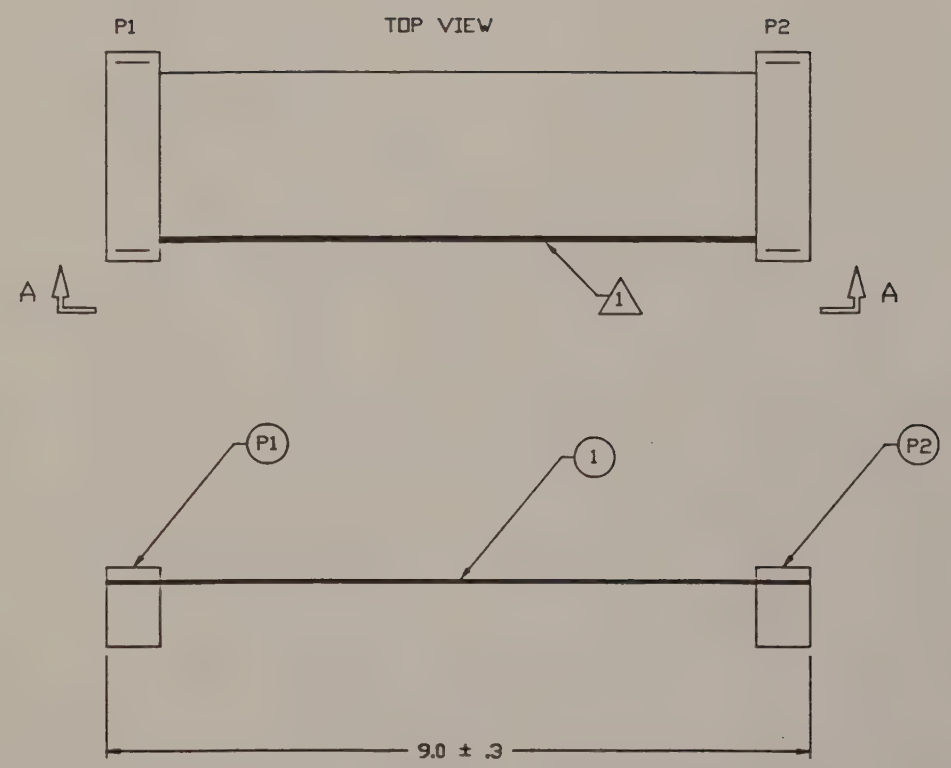


ITEM	QTY	S.A. STK NO.	DESCRIPTION	SPEC AND SIZE OR VALUE	IDENTIFYING NO.
PARTS LIST					
7	.1	77937	TUBING, HEAT SHRINK	.250 DIA.	
6	2	73045	TIES, CABLE	4.0 IN.	
5	2	85677	BEAD, FERRITE	.375X.187X.500	
4	.1 FT	77551	TUBING, HEAT SHRINK	.063 DIA	
3	.3 FT	77938	TUBING, HEAT SHRINK	.375 DIA	
2	1	174929	COVER	3 PIN .1 SP	
1	.5 FT	315673	CABLE, SHIELDED	2 COND 24 AVG	
P2	1	176026	CONN, RECT 1DC	3 CONTACT 24AWG	
P1	1	86781	JACK, PHONE	3 COND 3 CONTACT	

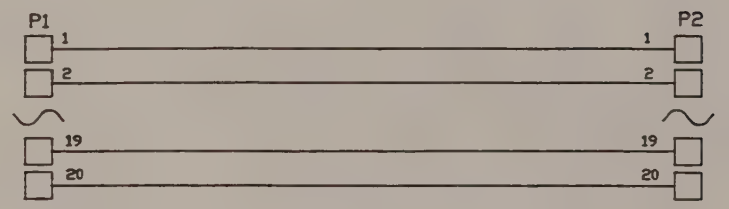
NOTES:

1. INSULATE EXPOSED DRAIN WIRE WITH ITEM 4.
2. ENSURE WIRES ARE COMPLETELY INSULATED WHEN CONNECTORS ARE BENT OVER AT 180° RADIUS.
3. ITEM 5 FERRITE BEAD MUST BE AS CLOSE TO CONNECTOR AS POSSIBLE AND COVER WITH HEAT SHRINK ITEM 3.
4. ENSURE SHIELDED STRANDS ARE TWISTED TIGHT BEFORE INSTALLING HEAT SINK.

Figure 5.39. Audio Cable (A1/A7/W2)



VIEW A-A

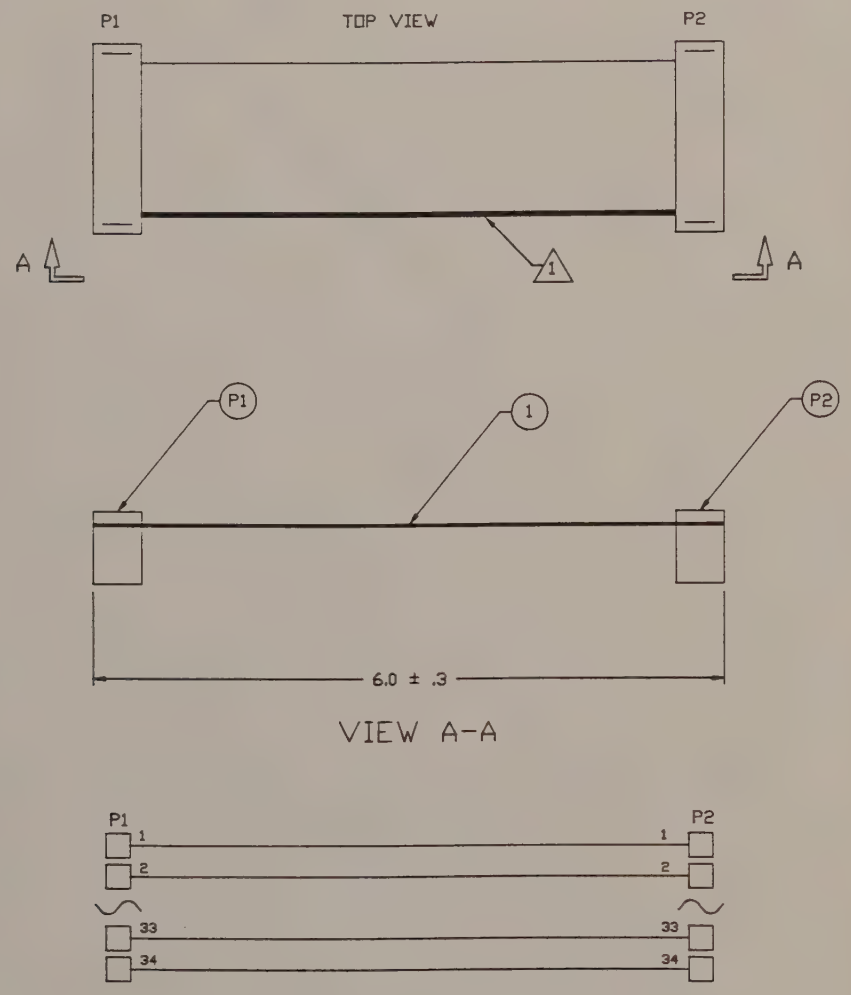


ITEM	QTY	S.A. STK NO.	DESCRIPTION	SPEC AND SIZE OR VALUE	IDENTIFYING NO.
1	.75 FT	84303	CBL, FLAT RIBBON	20 COND 28 AVG	MMM3365/20
P2	1	85049	CONN, FLAT CABLE	20 PIN FEM	MMM 3421-6000
P1	1	85049	CONN, FLAT CABLE	20 PIN FEM	MMM 3421-6000

PARTS LIST

1 DENOTES COND. #1 (RED LINE)

Figure 5.40. Display Cable Assembly (A1/A7/W3)

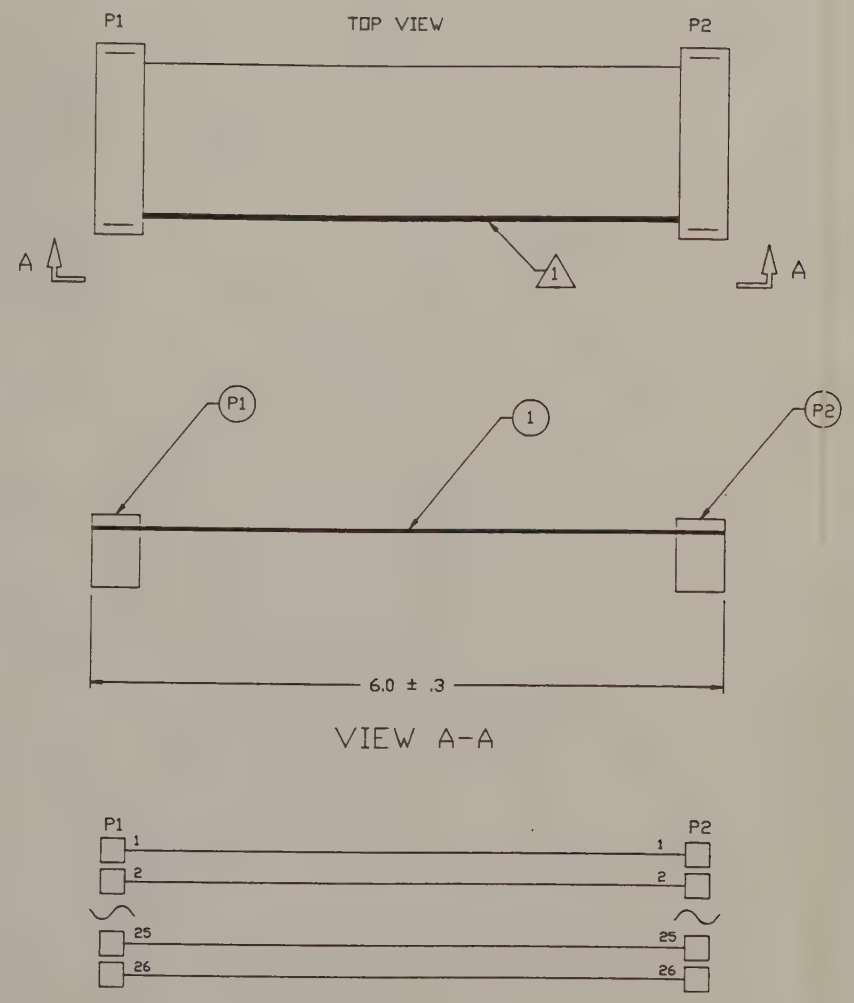


1 DENOTES COND. #1 (RED LINE)

ITEM	QTY	S.A. STK NO.	DESCRIPTION	SPEC AND SIZE OR VALUE	IDENTIFYING NO.
1	.5FT	83366	CBL, FLAT RIBBON	34 COND 28 AWG	MMM3365/34
P2	1	172124	CONN, FLAT, CABLE	34 PIN FEM	MMM 3414-6000
P1	1	172124	CONN, FLAT, CABLE	34 PIN FEM	MMM 3414-6000

PARTS LIST

Figure 5.41. Front-panel Interface Cable Assembly (A1/A7/W4)

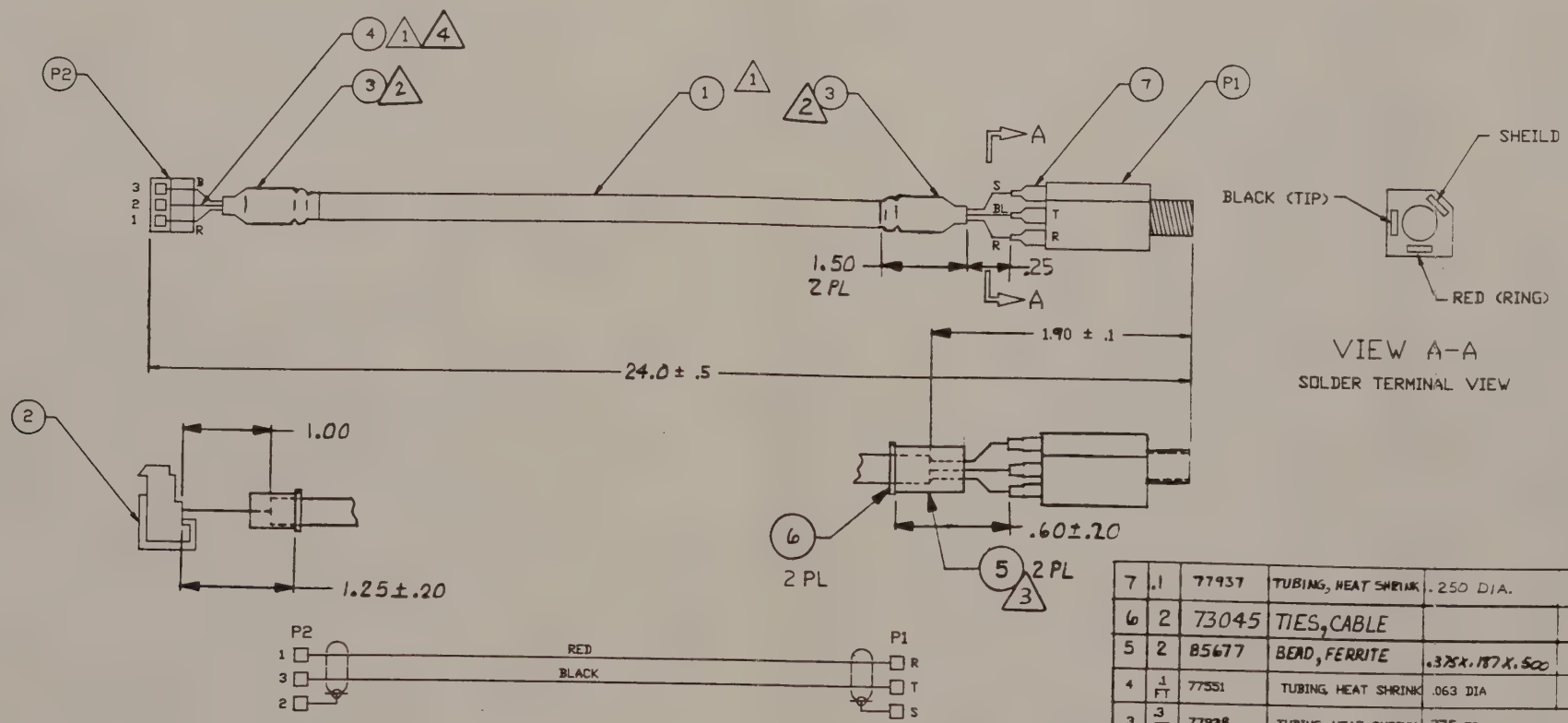


1 DENOTES COND. #1 (RED LINE)

ITEM	QTY	SA. STK NO.	DESCRIPTION	SPEC AND SIZE OR VALUE	IDENTIFYING NO.
1	.5 FT	82495	CBL, FLAT RIBBON	26 COND 28 AWG	MMM3365/26
P2	1	85050	CONN, FLAT CABLE	26 PIN FEM	MMM 3399-6000
P1	1	85050	CONN, FLAT CABLE	26 PIN FEM	MMM 3399-6000

PARTS LIST

Figure 5.42. Front-panel Interface Cable Assembly (A1/A7/W5)



ITEM	QTY	S.A. STK NO.	DESCRIPTION	SPEC AND SIZE OR VALUE	IDENTIFYING NO.
7	.1	77937	TUBING, HEAT SHRINK	.250 DIA.	
6	2	73045	TIES, CABLE		
5	2	85677	BEAD, FERRITE	.375x.187x.500	
4	.1 FT	77551	TUBING, HEAT SHRINK	.063 DIA	
3	.3 FT	77938	TUBING, HEAT SHRINK	.375 DIA	
2	1	174929	COVER	3 PIN .1 SP	
1	2.0 FT	315673	CABLE, SHIELDED	2 COND 24 AVG	
P2	1	176026	CONN, RECT IDC	3 CONTACT 24AVG	
P1	1	86781	JACK, PHONE	3 COND 3 CONTACT	

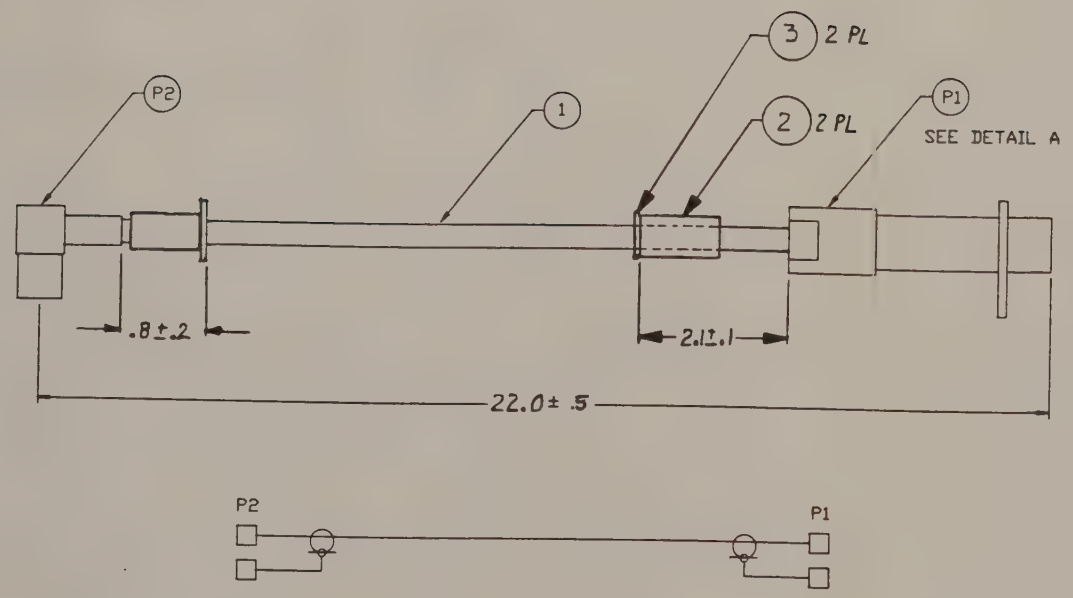
PARTS LIST

NOTES:

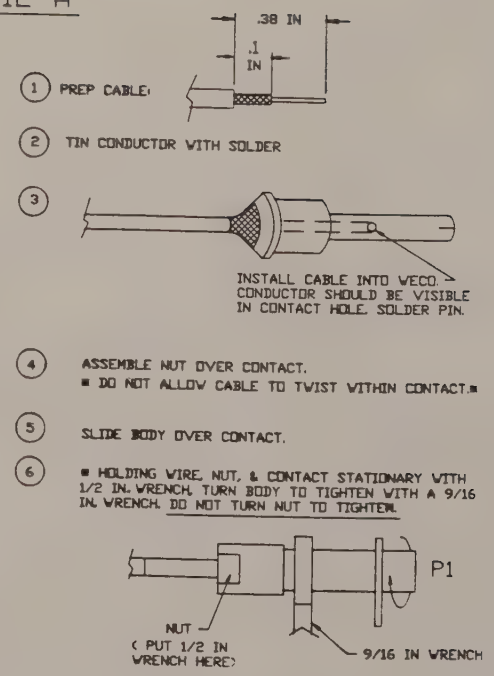
1. INSULATE EXPOSED DRAIN WIRE WITH ITEM 4.
2. ENSURE WIRES ARE COMPLETELY INSULATED WHEN CONNECTORS ARE BENT OVER AT 180° RADIUS.
3. ITEM 5 FERRITE BEAD MUST BE AS CLOSE TO CONNECTOR AS POSSIBLE AND COVER WITH HEAT SHRINK ITEM 3.
4. ENSURE SHIELDED STRANDS ARE TWISTED TIGHT BEFORE INSTALLING HEAT SINK.

Figure 5.43. DS1 Cable Assembly (A1/A7/W6 – A1/A7/W8)

456954
351052Z



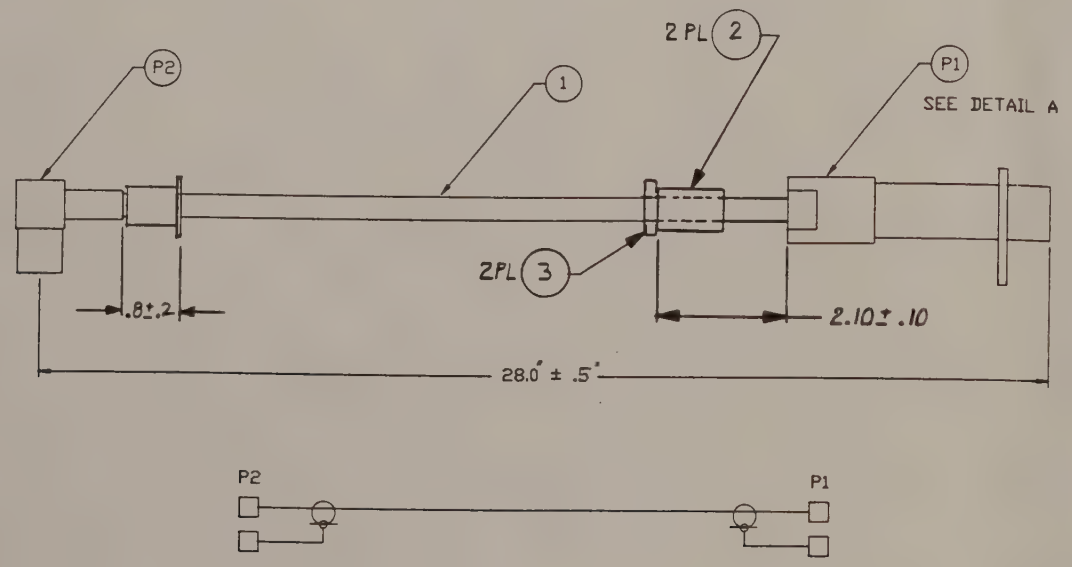
DETAIL A



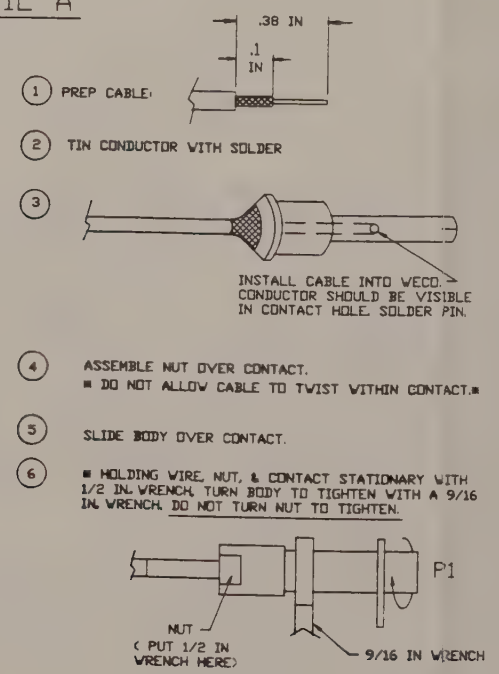
ITEM	QTY	S.A. STK NO.	DESCRIPTION	SPEC AND SIZE OR VALUE	IDENTIFYING NO.
3	2	73045	TIES, CABLE		
2	2	85677	BEADS, FERRITE	.375X.187X.500	
1	2.0 FT	83156	CABLE, COAX	75 OHMS	
P2	1	84938	CONN, COAX	75 OHMS, SMB	
P1	1	83419	CONN, COAX	JACK, PNL MNT	

PARTS LIST

Figure 5.44. DS3 22-inch Cable Assembly (A1/A7/W9)



DETAIL A



ITEM	QTY	S.A. STK NO.	DESCRIPTION	SPEC AND SIZE OR VALUE	IDENTIFYING NO.
3	2	73045	TIES, CABLE	4.0 IN.	
2	2	85677	BEAD, FERRITE	.375x.187 X.500	
1	2.5 FT	83156	CABLE, COAX	75 OHMS	
P2	1	84938	CONN, COAX	75 OHMS, SMB	
P1	1	83419	CONN, COAX	JACK, PNL MNT	

PARTS LIST

Figure 5.45. DS3 28–inch Cable Assembly (A1/A7/W10 – A1/A7/W13)

456955
351052Z

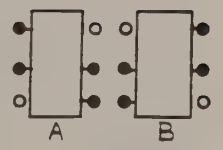
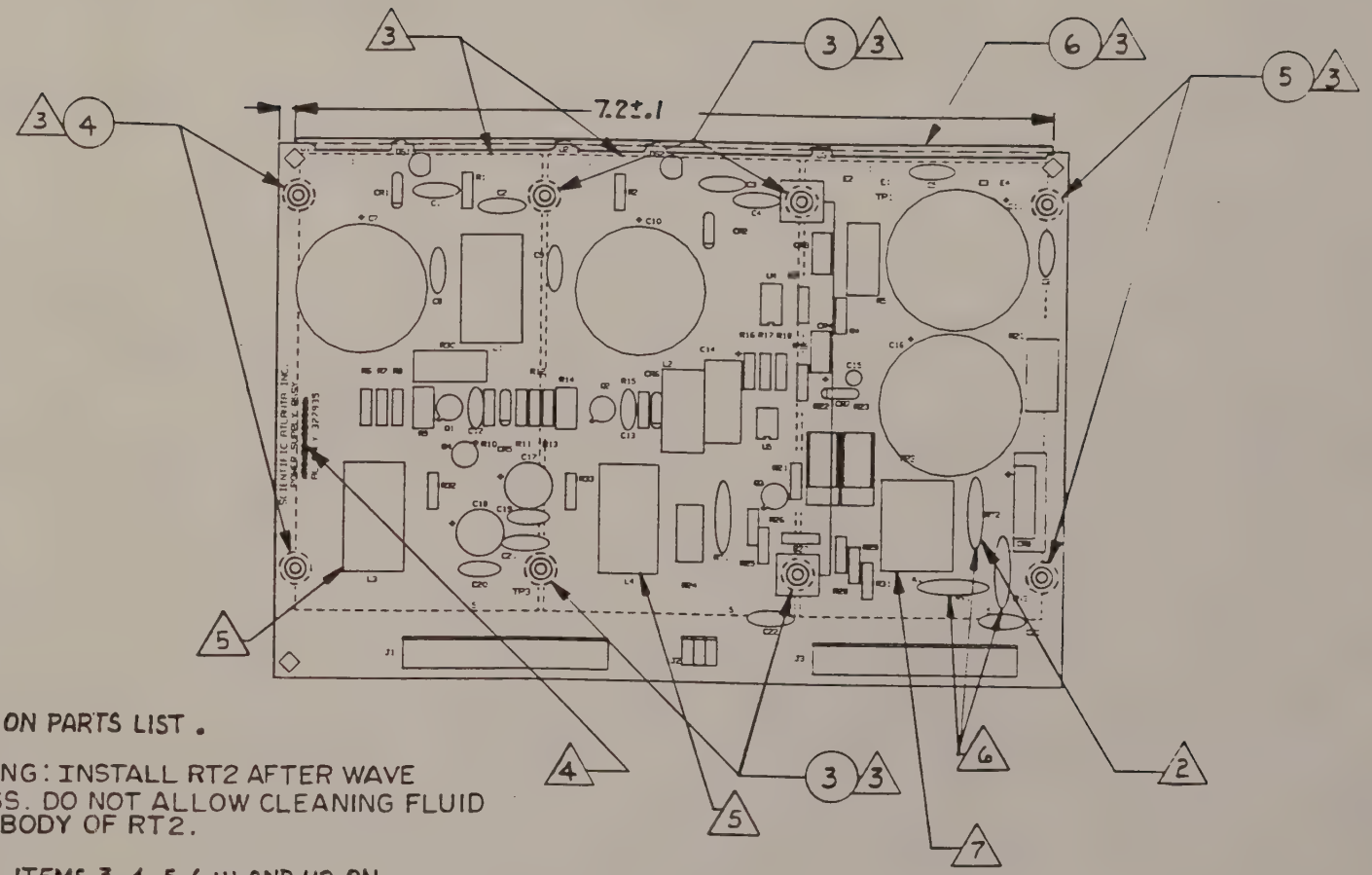


FIGURE 1



NOTES:

1. NOT INSTALLED ITEMS NOTED ON PARTS LIST.
2. IF FREON IS USED FOR CLEANING: INSTALL RT2 AFTER WAVE SOLDER & CLEANING PROCESS. DO NOT ALLOW CLEANING FLUID OR VAPOR TO CONTACT THE BODY OF RT2.
3. AFTER WAVE SOLDER, INSTALL ITEMS 3, 4, 5, 6, U1 AND U2 ON FARSIDE OF PWB. INSTALL U1, U2 AFTER FIRST TEST.
4. WITH A PERMANENT INK MARKER, MARK THRU "AC/DC 327911".
5. INSTALL L3 AND L4 AS SHOWN IN FIG. 1 WHICH BEST ALIGNS THESE ITEMS WITH SS OUTLINE.
6. INSTALL RT2 RV1 AND RV2 IN HOLES WHICH BEST ALIGNS THESE ITEMS WITH SS OUTLINE.
7. INSTALL K1 AFTER WAVE SOLDER & CLEANING.

SEE SEPARATE PARTS LIST 1

Figure 5.46. AC Power Supply Assembly (A1/A8)

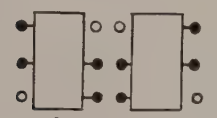
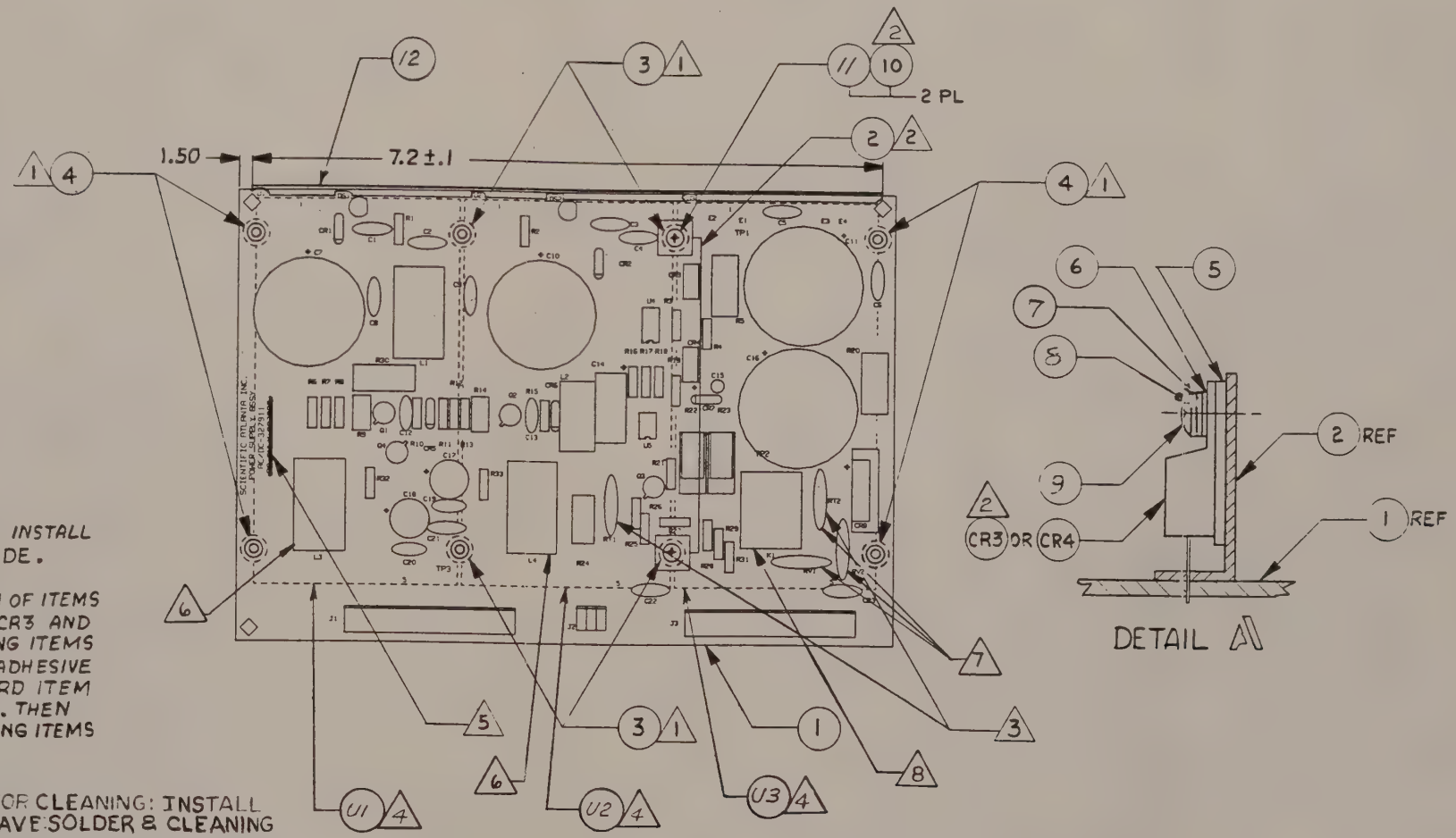


FIGURE 1

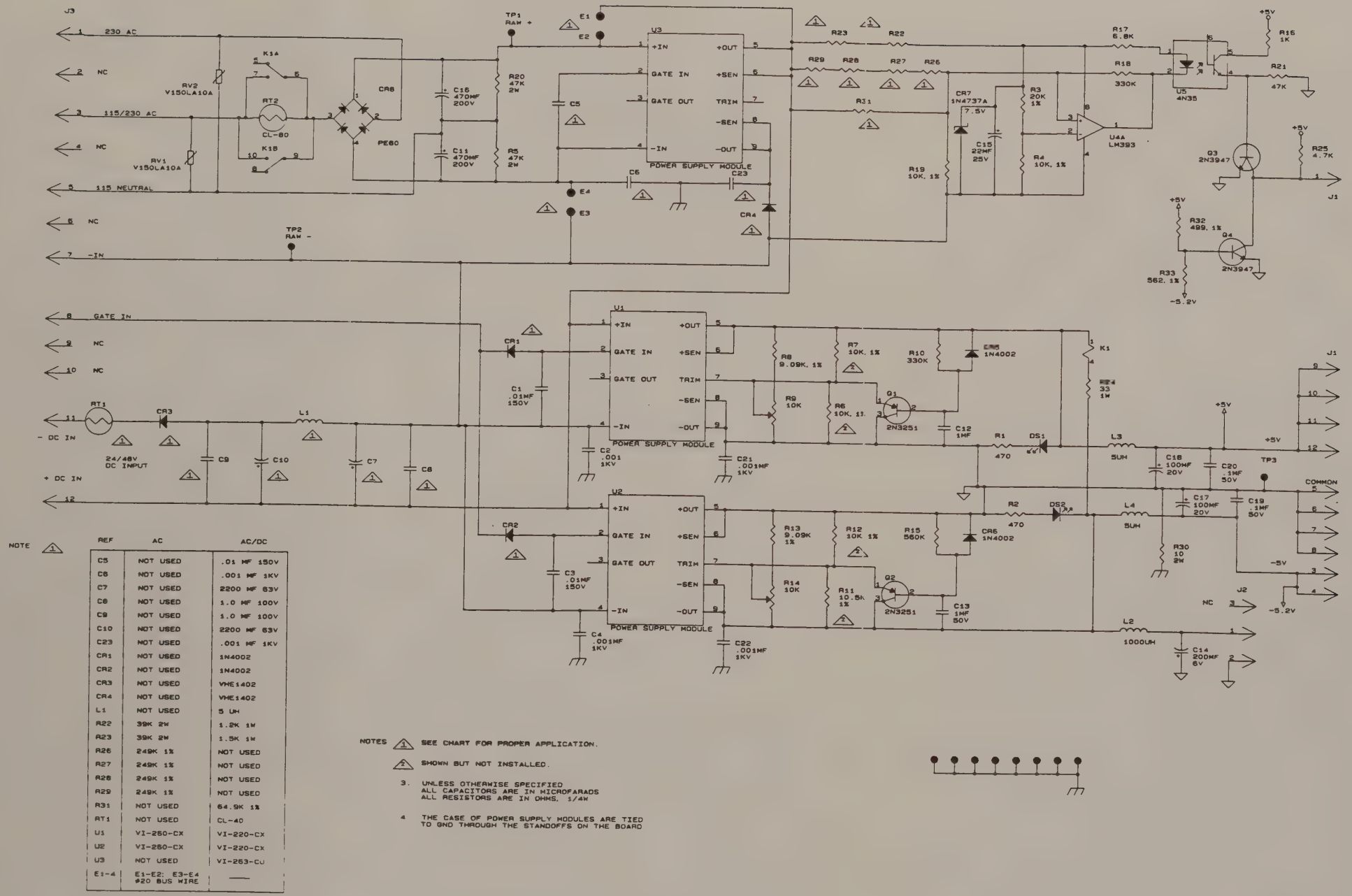


NOTES:

1. AFTER WAVE-SOLDER, INSTALL ITEMS 3 AND 4 FARSIDE.
2. AFTER INSTALLATION OF ITEMS 3 AND 4, INSTALL CR3 AND CR4 TO ITEM 2 USING ITEMS 5,6,7,8 AND 9 (WITH ADHESIVE SIDE OF ITEM 5 TOWARD ITEM 2) PER DETAIL "A". THEN INSTALL ITEM 2 USING ITEMS 10 AND 11.
3. IF FREON IS USED FOR CLEANING: INSTALL RT1 & RT2 AFTER WAVE SOLDER & CLEANING PROCESS. DO NOT ALLOW CLEANING FLUID OR VAPOR TO CONTACT THE BODY OF RT1 OR RT2.
4. AFTER INSTALLATION OF ALL OTHER COMPONENTS, INSTALL U1, U2, AND U3 AFTER FIRST TEST.
5. WITH A PERMANENT INK MARKER, MARK THRU "AC ONLY 327925".
6. INSTALL L3 AND L4 AS SHOWN IN FIG. 1 WHICH BEST ALIGNS THESE ITEMS WITH SS OUTLINE.
7. INSTALL RT2, RV1 AND RV2 IN HOLES WHICH BEST ALIGNS THESE ITEMS WITH SS OUTLINE.
8. INSTALL K1 AFTER WAVE SOLDER & CLEANING.

Figure 5.47. AC/DC Power Supply Assembly (A1/A8)

327911A
351052Z



NOTE 1	REF	AC	AC/DC
	C5	NOT USED	.01 MF 150V
	C6	NOT USED	.001 MF 1KV
	C7	NOT USED	2200 MF 63V
	C8	NOT USED	1.0 MF 100V
	C9	NOT USED	1.0 MF 100V
	C10	NOT USED	2200 MF 63V
	C23	NOT USED	.001 MF 1KV
	CR1	NOT USED	1N4002
	CR2	NOT USED	1N4002
	CR3	NOT USED	VHE1402
	CR4	NOT USED	VHE1402
	L1	NOT USED	5 UH
	R22	39K 2W	1.2K 1W
	R23	39K 2W	1.5K 1W
	R26	249K 1%	NOT USED
	R27	249K 1%	NOT USED
	R28	249K 1%	NOT USED
	R29	249K 1%	NOT USED
	R31	NOT USED	64.9K 1%
	RT1	NOT USED	CL-40
	U1	VI-260-CX	VI-220-CX
	U2	VI-260-CX	VI-220-CX
	U3	NOT USED	VI-263-CU
	E1-4	E1-E2; E3-E4 #20 BUS WIRE	——

NOTES
1. SEE CHART FOR PROPER APPLICATION.
2. SHOWN BUT NOT INSTALLED.
3. UNLESS OTHERWISE SPECIFIED ALL CAPACITORS ARE IN MICROFARADS ALL RESISTORS ARE IN OHMS, 1/4W
4. THE CASE OF POWER SUPPLY MODULES ARE TIED TO GND THROUGH THE STANDOFFS ON THE BOARD

Figure 5.48. AC Power Supply Schematic (A1/A8)

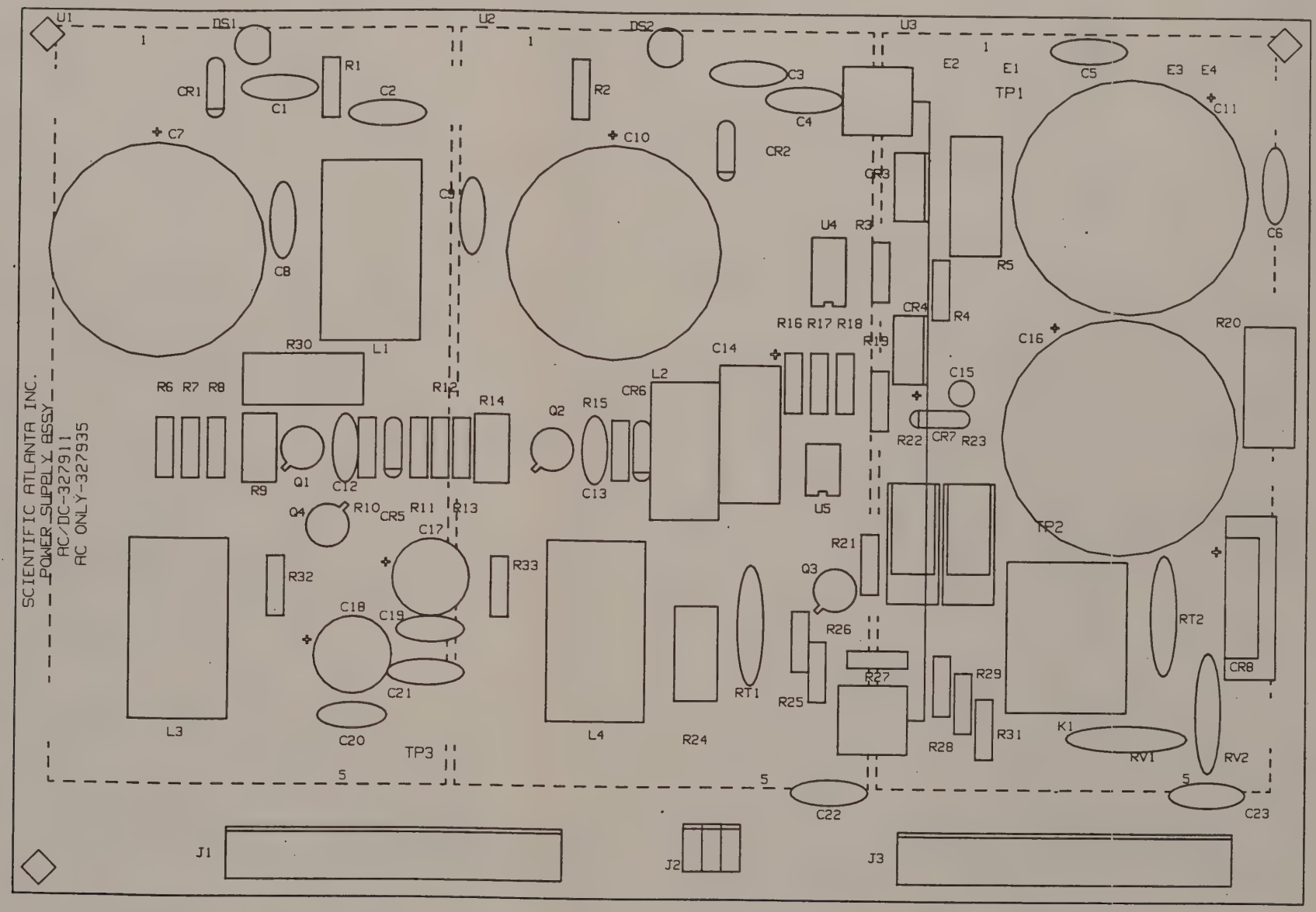


Figure 5.49. AC Power Supply PWB Assembly (A1/A8/A1)

Scientific-Atlanta

MANUAL UPDATE

Title: Model AT 9500 Digital Transmission Analyzer Maintenance Manual

Publication No.: 35I052Z

Revision Letter: Z

Update No.: 1

Date: 12/21/90

Updates have occurred since the last printing of this manual. This Update package consists of new and updated pages.

Updates are marked with the **Update No.** next to the Publication Number, and with a vertical bar in the margin next to the corresponding change. When the manual is revised, these bars are removed. If the entire page, figure or table is new, bars may be placed next to the page number, figure number, or table number only. If entire paragraphs are updated, a bar may appear by the paragraph title and number only (if applicable) and not the entire portion.

To update the manual, remove and insert pages as follows:

REMOVE	INSERT
3-5	3-5
3-22	3-22
3-41	3-41
3-64	3-64
3-72	3-72
3-104	3-104
4-6	4-6
4-15	4-15
4-41	4-41
4-46	4-46
4-48	4-48
4-56	4-56

First thing, check your power sources.

Using the ac source. Check that the analyzer is plugged in properly. If the source is controlled by a switch make sure the switch is on. Check the source voltage at the analyzer's chassis connector and check the fuses.

Using the dc source. Check dc source connections for proper polarity. Check the fuses.

Turn on the analyzer.

Screen does not light. Go to Section 3.3, Internal Troubleshooting.

The front-panel POWER switch shows a green dot; the sign-on screen appears, followed by a summary screen, see Figures 3.2 and 3.3.

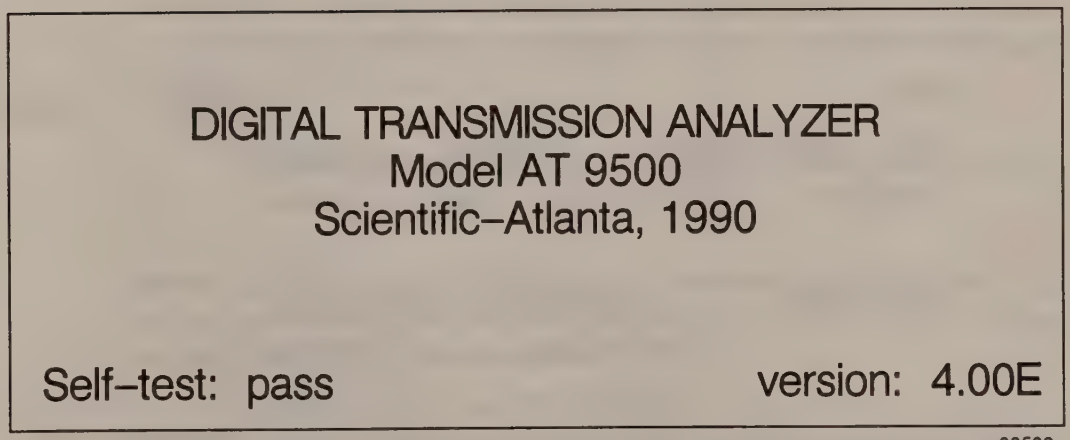


Figure 3.2. Typical Sign-on Screen

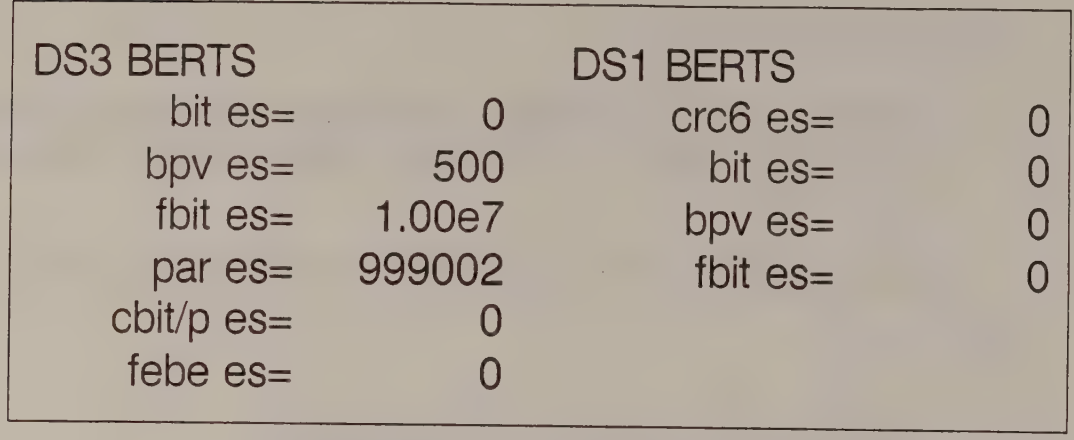


Figure 3.3. Typical Summary Screen

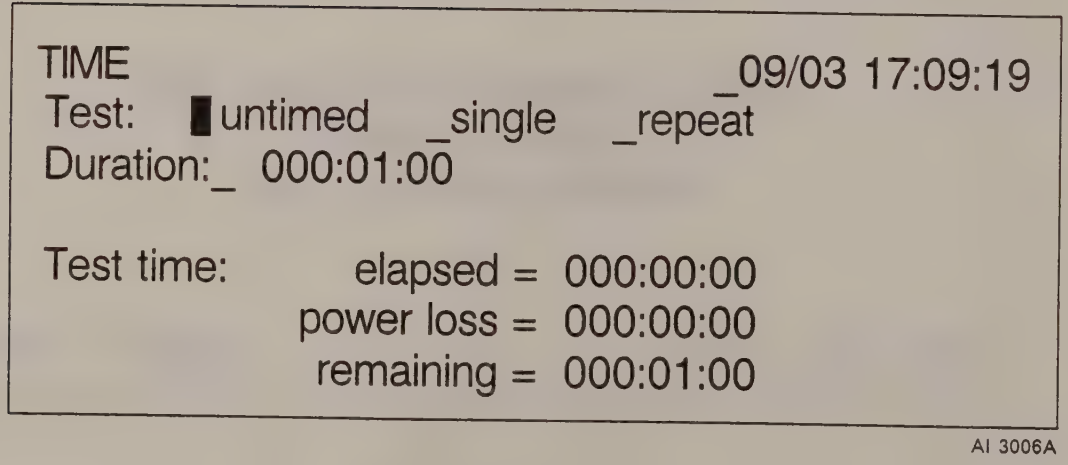


Figure 3.4. Typical TIME Screen

Voltage missing or voltage out of tolerance. Replace power supply. Here's how you do that.

(1) Turn off power.

(2) Remove real-time clock card, and CPU card, see Figure 3.14.

(3) On rear panel of analyzer, remove four screws holding power supply to rear of analyzer, see Figure 3.14. Power supply cover will come off.

(4) On the bottom of the power supply card are three cables, see Figure 3.14. Unsnap connector and remove mothercard cable and ac power cable.

(5) Disconnect fan cable and remove power supply.

(6) Install replacement power supply.

Voltages correct. Run diagnostic test, Section 3.3.5.

Sign-on screen appears, the front-panel LEDs light properly, then screen shows "RECEIVER CHANNELS NOT INSTALLED". The CPU card, real-time clock card and mothercard are OK but the CPU doesn't recognize the demux. Check demux card, Section 3.3.3.

Sign-on screen appears, summary screen does not. On front of analyzer, on the SETUP panel, push XMTR.

Screen shows "TRANSMITTER CHANNELS NOT INSTALLED." If transmitter card is installed, check transmitter bus interface, Section 3.3.2.3. If not, on front of analzyer, on the RESULTS panel, push AUX.

Screen shows AUX CARDS NOT INSTALLED. If optional signal analysis card is installed, go to Section 3.3.4.

No sign-on screen, but front-panel LEDs light. The mothercard, the CPU card and the real-time clock card are OK. Check the LCD module and cable, and the front-panel and front panel driver cards, with diagnostic test, Section 3.3.5

2. Plug in the transmitter card and demultiplexer card, in sequence. If LCD screen goes out when you install either card, then that card is bad. See Section 3.3.2 for transmitter card and Section 3.3.3 for demultiplexer card.

3.3.2 Transmitter Card

Several steps in the external troubleshooting procedure point you toward the transmitter card, but all the indications mean the same thing: No bipolar signal or an unacceptable bipolar signal at either DS1 or DS3 outputs, or on both.

NOTE

Some integrated circuits on the transmitter card are programmed and can only be replaced by Scientific-Atlanta. They are all in the Parts List, Chapter 4, but for your convenience, they're listed here too.

Reference Designator	Scientific-Atlanta Part Number
U1	0304112
U2	0177395
U3	0173221
U4	0327878
U5	0327877
U6	0327876
U7	0174506
U8	0252731
U9	0172465
U10	0174228
U11	0173221
U12	0327878
U13	0457040
U14	0327876
U15	0174227
U16	0089239
U17	0174227
U18	0461092
U19	0461501 (Set)
U20	0081658
U21	0174111
U22	0177003
U23	0177003
U24	0177002
U25	0309149
U26	0177002
U27	0309625
U28	0174000
U29	0177499
Z1	0327940
Z2	0327944
Z3	0327944

NOTE

Some integrated circuits on the demux card are programmed and can only be replaced by Scientific-Atlanta. They are in the Parts List, Chapter 4, but are also listed here for your convenience.

Reference Designator	Scientific-Atlanta Part Number
U1	0307959
U10	0457000
U28	0307951
U29	0306224
U36	0457001
U38	0307957
U40	0307963
U2	0327877
U3	0327878
U4	0327877
U5	0327876
U9	0327875
U17	0327878
U18	0457040
U19	0327876
U24	0327875
U26	0355983
Y1	0318996
Z1	0327940
Z2	0327944
	0457017 (Set)

3.3.3.1 DS1 Circuit

In the procedure you will be asked to check for data pattern 1010. Figure 3.25 is data pattern 1010 with no framing.

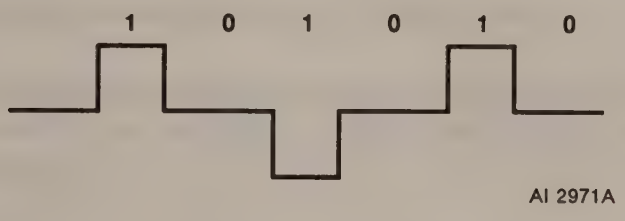


Figure 3.25. Data Pattern 1010

Here's how you get data pattern 1010.

1. On the front of the analyzer, on the SET UP panel, push XMTR button. SELECT XMTR screen gives you your choice of __DS1 BERTS or __DS3 BERTS, see Figure 3.26.

2. Choose __DS1 BERTS and push ENTER. Screen will now show DS1 BERTS XMTR SETUP, see Figure 3.27.

3. Move cursor to "Frame:" line, position "__none" and push ENTER.

4. On the "Pattern:" line, move cursor to "__fixed" and push ENTER.

5. On the "Fixed:" line, move cursor to "__1010" and push ENTER. These settings will produce data pattern 1010, see Figure 3.25.

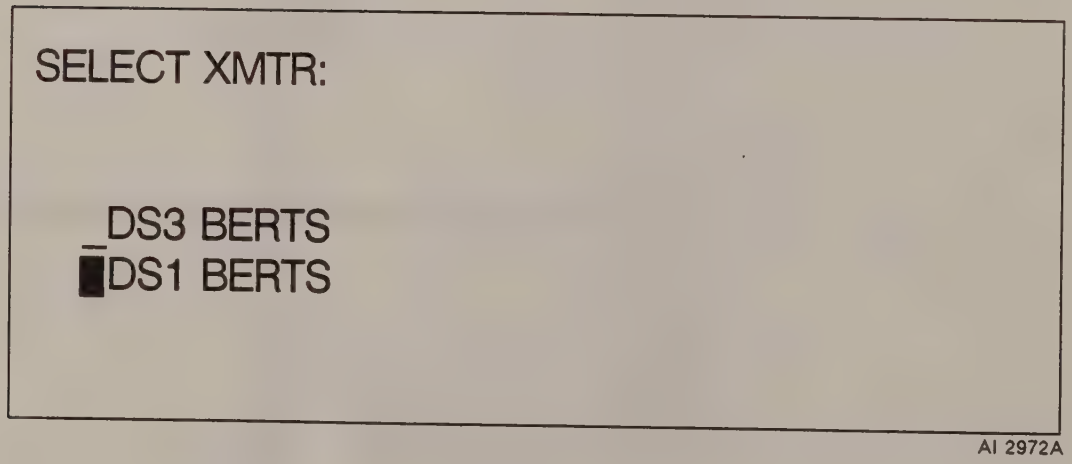


Figure 3.26. SELECT XMTR Screen

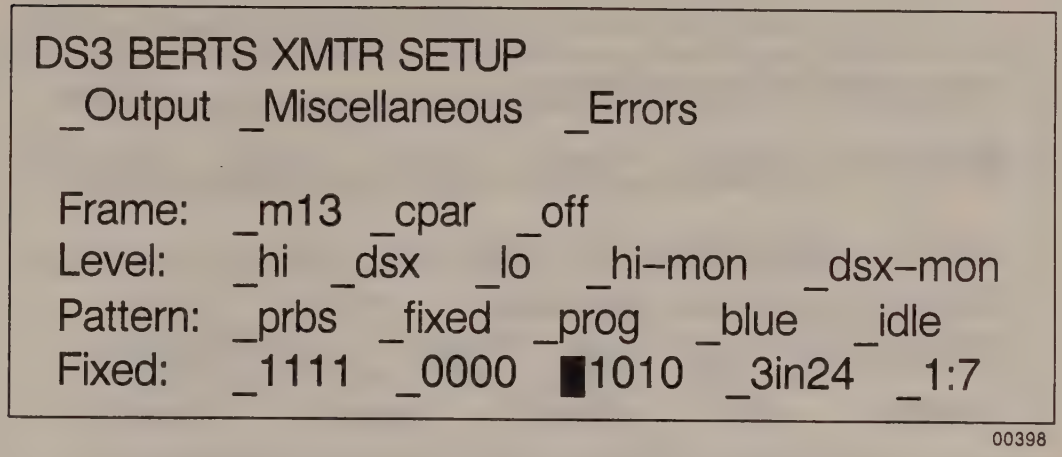


Figure 3.43. DS3 BERTS XMTR SETUP Screen

3. Use arrow key to move cursor to "__Output" and push ENTER.

4. Then, move cursor to "Frame:" line, to "__off," push ENTER, then to the "__Pattern:" line, choose "__fixed" and on the "Fixed:" line, choose "__1010."

5. Use oscilloscope with FET probe to check output pin 11 of U9 for data pattern 1010, see Figure 3.41.

   No data pattern 1010 at output pin 11 of U9. Check input pin 23 of U9 for data pattern 1010.

   Data pattern 1010 is at input pin 23 of U9. Replace U9.

   Data pattern 1010 not at input pin 23 of U9. Check input to relay K1, pin 10 for data pattern 1010.

   Data pattern 1010 is at pin 10 of relay K1. On front panel of analyzer, on SETUP panel, push RCVR, then choose DS3. You'll see DS3 BERTS RCVR SETUP screen, see Figure 3.44.

6. On "Level:" line, move cursor to "__dsx/low" and press ENTER. Now, back to relay K1. You have data pattern 1010 at pin 10 of relay K1.

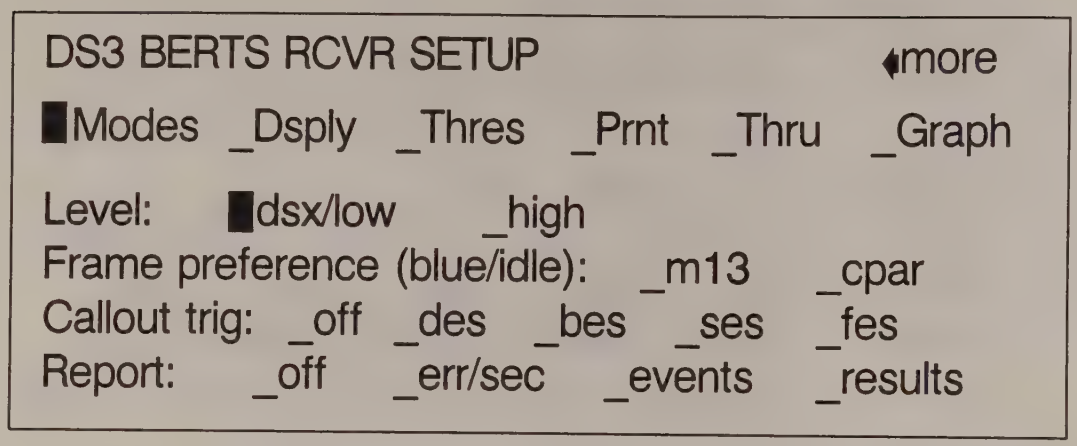


Figure 3.44. DS3 BERTS RCVR SETUP Screen

7. Check pin 3 of relay K1 for signal.

No signal at pin 3 and DS3 RCVR Level set on "dsx/low." Check buffer Q1. On front panel of analyzer, on "Level:" line, move cursor to "__high" and push ENTER. Check pin 3 of relay K1 for signal.

No signal at pin 3 and DS3 RCVR Level is set on "high." Replace K1.

Data pattern 1010 is at output pin 11 of U9. With oscilloscope, check output of U9 at pin 30 for TTL clock pulse at 44.736 MHz.

There are three possibilities: No TTL clock pulse, a TTL clock pulse at 44.736 MHz, or a TTL clock pulse at the wrong frequency.

No TTL clock pulse at pin 30 of U9. Replace chip U9.

TTL clock pulse at 44.736 MHz is at pin 30 of U9. Check for +5 volts dc at pin 28 of U9.

-5 volts at pin 28 of U9. Replace U9.

No square wave at pin 11 of U13. Check pin 7 of connector J2B for square wave.

Square wave at pin 7 of J2B. Replace U10.

Square wave is not at pin 7 of J2B. Check mothercard, Section 3.3.6.

Square wave at pin 11 of U13. Check pin 13 of U13 for 50 millisecond latch signal.

Latch signal is at pin 13 of U13. Replace U13. If still no frequency, check 50-millisecond latch signal from Real-Time Clock Card, with diagnostic test, Section 3.3.5.

No latch signal at pin 13 of U13. Replace U10 and then, if necessary, U5.

Step Six: Check DS3 to DS0 Demultiplexing.

NOTE

Analyzer does not provide a DS3 signal for this test. Plug external DS3 in front panel at DS3 RX.

1. On the front of the analyzer, on the SETUP panel, choose RCVR, then, on the RESULTS panel, choose DS1 and press ENTER.

2. Move cursor to "__Modes" and push ENTER. Your screen will be similar to DS1 BERTS RCVR SETUP page, see Figure 3.51.

3. Move cursor to the "Input source:" line, to "__demux" and push ENTER. The software program will force the DS1 A LOS light off, which means the receiver is set for demux signal input.

4. Connect external DS3 signal to DS3 RX connector on front panel.

   DS3 LOS and DS3 OOF lights go off. Go to step 5.

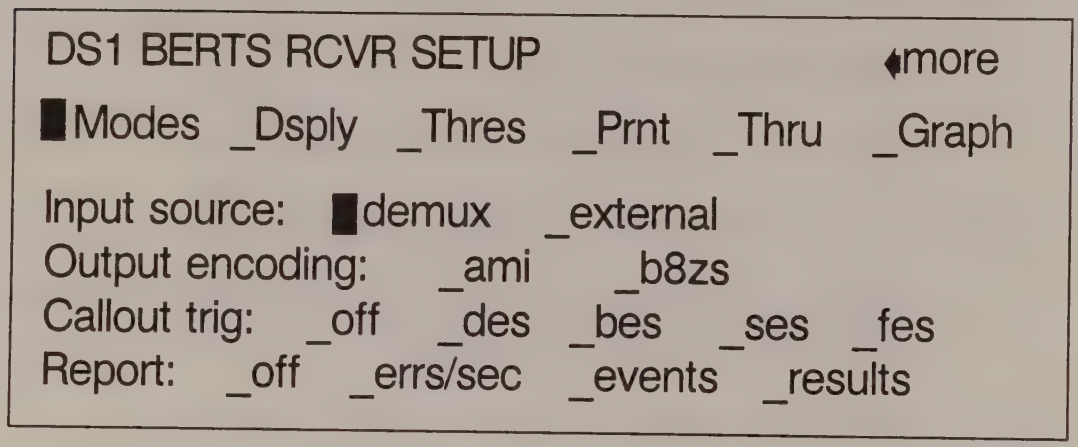


Figure 3.51. DS1 BERTS RCVR SETUP Screen

DS3 LOS and DS3 OOF lights don't go off. Check the DS3 channel, see **Step One** of this section.

DS1 OOF light goes off. DS2 framing is OK go to next step.

DS1 OOF light does not go off. Check DS2 framing. Here's how you do that.

1. On the top edge of the demux card are eight LEDs, see Figure 3.52. Check the DS2 OOF LED; it is labeled 2FL.

   LED 2FL is off. DS2 is framed. Go to step 5.

   LED 2FL is on. DS2 has not framed. Replace U2.

   LED 2FL goes off. DS2 frame is good. Go to step 5.

   LED 2FL stays on. Run diagnostic test, Section 3.3.5.

Set the serial terminal like this: 9600 baud, 8 data bits, 1 stop bit, no parity. There is no software (XON, XOFF) or hardware (RTS< CTS) flow-control on the diagnostic program.

Tests that pass are written to the terminal, so a listing of successful tests are either printed or appear on the CRT, or both, depending on what you have on the serial port.

Figure 3.72 lists a description of the 29 diagnostic tests.

Step One: Turn on the analyzer.

Sign-on screen, see Figure 3.74, appears followed by a summary screen, see Figure 3.75. Go to **Step Two.**

Sign-on screen does not appear. Go to **Step Two.**

Sign-on screen appears, but summary screen does not. Check the clock circuit on the real-time clock card. Here's how you do that:

On the front of the analyzer, on the TEST panel, push TIME. LED in the TIME switch lights, and TIME screen appears, see Figure 3.76. Readout in upper right of TIME screen gives date and time. Check that clock is running.

Clock is running. Go to **Step Two.**

Clock is not running. Select SUMMARY screen, then return to TIME screen and check that clock is still running.

Clock has reset to zero and is running. Check clock battery. Here's how you do that:

NOTE

The AT 9500 Analyzer will work without a charged battery, but each time you turn the analyzer on, you'll have to reset the clock. Also, the historical data will not be saved.

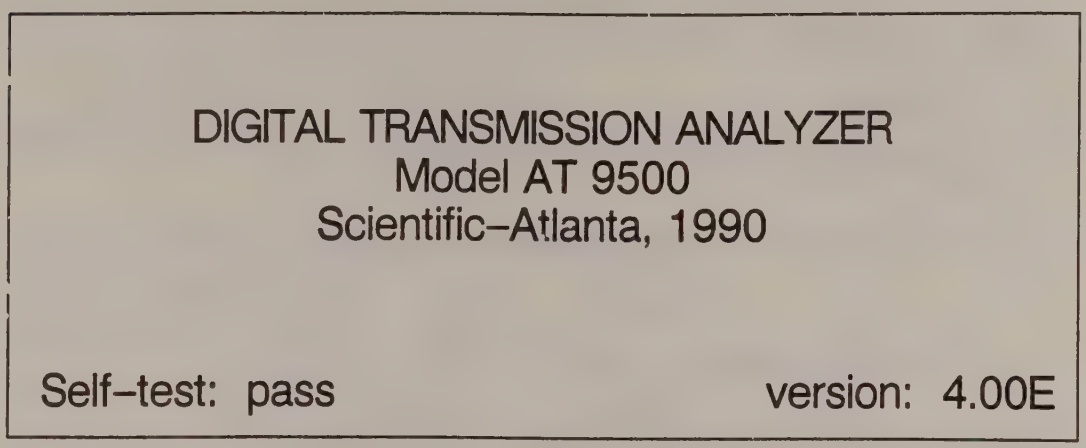


Figure 3.74. Typical Sign-on Screen

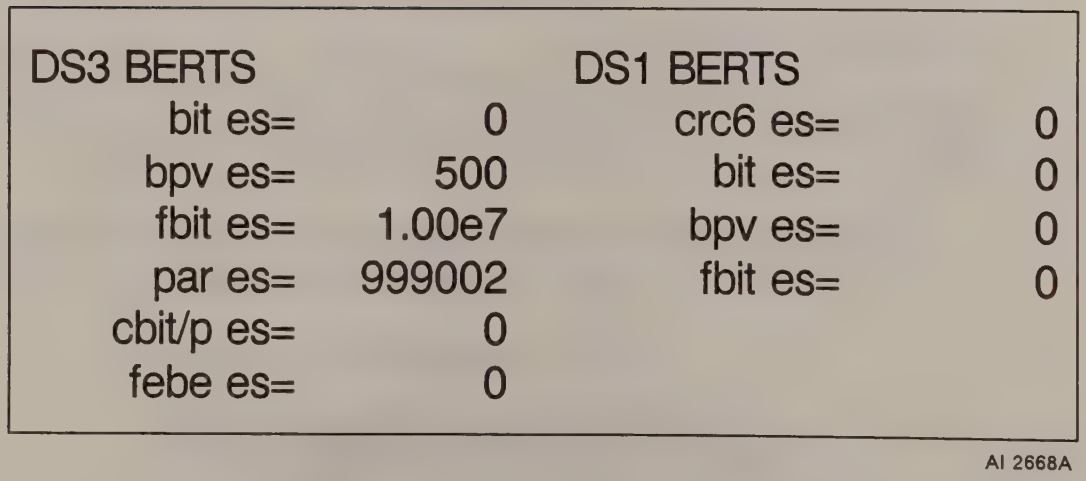


Figure 3.75. Typical Summary Screen

FAN ASSEMBLY (A1/W4) - 327959

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
B1	0177178	FAN 3.15 SQ 5VDC.44A 26 CMF	FSC80-05M	
P1	0176026	CONN RECT MASS TERM 3 POS	CE100F24-3	

DS3-DS1/DS0 DEMUX DTA ASSEMBLY (A1/A1) - 327970

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
1	0307223	SUB-ASSY PWB DS3-DS1/DSO DEMUX		
2	0082463	EXTRACTOR PC BOARD	5005-08N	13103
3	0461502	EPROM & LABEL SET DEMUX		
J5	0084940	CONN COAX SMB MALE PC MT 75 OHM	51-151-0000	98291
J7	0174930	CONN HEADER SGL ROW STRAIGHT 3-PIN LK	MLSS100-3	
J8	0084940	CONN COAX SMB MALE PC MT 75 OHM	51-151-0000	98291
J10	0174930	CONN HEADER SGL ROW STRAIGHT 3-PIN LK	MLSS100-3	
J13	0174930	CONN HEADER SGL ROW STRAIGHT 3-PIN LK	MLSS100-3	
J15	0085126	CONN HEADER DBL ROW STRAIGHT 10-PIN PC	87227-5	00779
U1	0307959	ASSY PAL PROGRAM U1 DEMUX		
U10	0457000	ASSY PAL PROGRAM U10 DEMUX		
U28	0307951	ASSY PAL PROGRAM U28 DEMUX		
U29	0461091	ASSY PAL PROGRAM U29 DEMUX		
U36	0457001	ASSY PAL PROGRAM U36 DEMUX		
U38	0307957	ASSY PAL PROGRAM U38 DEMUX		
U40	0307963	ASSY PAL PROGRAM U40 DEMUX		

DS3-DS1/DS0 DEMUX SUBASSEMBLY (A1/A1/A1) - 307223

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
BB1	0177102	BUS DSTRBTN 2-LYR VERT MT DIP	QV-2 17.6.3 (.1)	
BB2	0177102	BUS DSTRBTN 2-LYR VERT MT DIP	QV-2 17.6.3 (.1)	
C1	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C2	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C3	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C4	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C5	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C6	0081210	CAPACITR .01 MF 50V CER MONO X7R 10%	RPE121X7R103K50V	72982
C7	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C8	0070470	CAPACITR 10 PF 500V SILVER MICA 5%	CD15CD100J03	14655
C9	0174000	NOT USED ON THIS ASSEMBLY		
C10	0035656	CAPACITR 100 MF 20V SOLID TANT POL 10%	T362D107K020AS	05397

U13	0177252	IC CMOS CNTR 8-BIT BINARY	SN74HC590AN	
U14	0176276	IC MEM CMOS FIFO 64X4 ASYNC	CY7C403-25PC	
U15	0173221	IC CMOS GATE NAND 2-IN QUAD	MM74HC00N	
U16	0174227	IC CMOS LATCH 8-BIT ADDRESSABL	MM744C259N	
U17	0327878	IC PATTERN GENERATOR		
U18	0457040	IC FRAMER		
U19	0327876	IC CLOCK REC DIGITAL		
U20	0172455	IC CMOS GATE AND 2-IN QUAD	MM74HC08N	
U21	0081658	IC TTL BUFFER HEX OPEN-COL	SN7407N	01295
U22	0089590	RESISTOR NETWORK 5 4.7K OHM 2% 6 SIP	4306R-101-472	
U23	0086514	IC OP AMP JFET 8L-DIP 70C COMP DUAL	TL082ACP	
U24	0327875	IC DS1/1C/2/3 ANALOG CLOCK REC		
U25	0177105	IC PLL 18 MHZ 16L-DIP	MM74HC4046N	
U26	0355983	IC CMOS INVERTER HEX UNBUFFER		
U27	0176744	OPT-ISLR 1.5KV PK FET PHODETR	H11F1	
U28	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U29	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U30	0330210	IC CMOS FLIP-FLOP TYPE-D	MC74HC374N	
U31	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U32	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U33	0177002	IC CMOS BUFFER 10-BIT NONINVRT	AM29C827PC	
U34	0177003	IC CMOS TRANSCVR BUS 10-BIT	AM29C861/BLA	
U35	0177003	IC CMOS TRANSCVR BUS 10-BIT	AM29C861/BLA	
U36	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	

DS3-DS1/DS0 DEMUX SUBASSEMBLY (A1/A1/A1) - 307223 (cont.)

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
U37	0177002	IC CMOS BUFFER 10-BIT NONINVRT	AM29C827PC	
U38	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U39	0176276	IC MEM CMOS FIFO 64X4 ASYNC	CY7C403-25PC	
U40	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U41	0177104	IC PCM ENCDR/DCDR WITH FILTERS	TCM2913J	
W1	0306222	CABLE 5.5 IN CHABIN	981616-020-005.50	
XU1	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU2	0177011	SOCKET 68 POS PLCC PC MT	PLCC-68-P-T	
XU3	0177011	SOCKET 68 POS PLCC PC MT	PLCC-68-P-T	
XU4	0177011	SOCKET 68 POS PLCC PC MT	PLCC-68-P-T	
XU5	0177011	SOCKET 68 POS PLCC PC MT	PLCC-68-P-T	
XU9	0177092	SOCKET 44 POS PLCC PC MT	PLCC-44-P-T	
XU10	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU17	0177011	SOCKET 68 POS PLCC PC MT	PLCC-68-P-T	
XU18	0177011	SOCKET 68 POS PLCC PC MT	PLCC-68-P-T	
XU19	0177011	SOCKET 68 POS PLCC PC MT	PLCC-68-P-T	
XU24	0177092	SOCKET 44 POS PLCC PC MT	PLCC-44-P-T	
XU28	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU29	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU30	0086897	SOCKET 20-PIN DIP PC MT	ICT-203-S-T	
XU31	0177349	SOCKET 32-PIN PCMT 6-LEAD SPACE	ICT-326-S-TG	
XU32	0177349	SOCKET 32-PIN PCMT 6-LEAD SPACE	ICT-326-S-TG	
XU33	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU34	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU35	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU36	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU37	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU38	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU40	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU41	0086897	SOCKET 20-PIN DIP PC MT	ICT-203-S-T	
Y1	0318996	CRYSTAL 1.544 MHZ SERIES .002%	PER SA DWG 318996	
Z1	0327940	HYBRID 75 OHM DSX - 3	PER SA DWEG 327940	
Z2	0327944	HYBRID 100 OHM DS1 OUTPUT	PER SA DWG 327944	

TRANSMITTER CARD ASSEMBLY (A1/A3) - 309123

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
1	0309237	SUB-ASSY PWB XMTR MDL AT 9500		
2	0082463	EXTRACTOR PC BOARD	5005-08N	13103
3	0461501	EPROM & LABEL SET XMTR DTA/DAS	5005-08N	13103
J11	0084940	CONN COAX SMB MALE PC MT 75 OHM	51-151-0000	98291
J12	0084940	CONN COAX SMB MALE PC MT 75 OHM	51-151-0000	98291
J13	0084940	CONN COAX SMB MALE PC MT 75 OHM	51-151-0000	98291
J14	0174930	CONN HEADER SGL ROW STRAIGHT 3-PIN LK	MLSS100-3	
U18	0461092	ASSY PAL PRGM U18 XMTR DTA/DAS		
U25	0309149	ASSY PAL PRGM U25 XMTR DTA/DAS		
U27	0458355	ASSY PAL PRGM U27 XMTR DTA/DAS		

TRANSMITTER SUBASSEMBLY (A1/A3/A1) - 309237

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
2	0317056	DUAL IN-LINE PAD	814-045	
BB1	0177102	BUS DSTRBTN 2-LYR VERT MT DIP	QV-2 17.6.3 (.1)	
BB2	0177237	BUS DSTRBTN 3-LYR VERT MT DIP	QV-3 4.10.1.2 (.2)	
C1	0083649	CAPACITR 7-25 PF MIN CER DISC PC MT	538-011-B-7-25	72982
C2	0083649	CAPACITR 7-25 PF MIN CER DISC PC MT	538-011-B-7-25	72982
C3	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C4	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C5	0083258	CAPACITR CHIP .1 MF 50V	C1813C104M5XAH	
C6	0081210	CAPACITR .01 MF 50V CER MONO X7R 10%	RPE121X7R103K50V	72982
C7	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C8	0081210	CAPACITR .01 MF 50V CER MONO X7R 10%	RPE121X7R103K50V	72982
C9	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C10	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C11	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C12	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C13	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C14	0081210	CAPACITR .01 MF 50V CER MONO X7R 10%	RPE121X7R103K50V	72982

C15	0081210	CAPACITR .01 MF 50V CER MONO X7R 10%	RPE121X7R103K50V	72982
C16	0081210	CAPACITR .01 MF 50V CER MONO X7R 10%	RPE121X7R103K50V	72982
C17	0081210	CAPACITR .01 MF 50V CER MONO X7R 10%	RPE121X7R103K50V	72982
C18	0081210	CAPACITR .01 MF 50V CER MONO X7R 10%	RPE121X7R103K50V	72982
C19	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C20	0174000	NOT USED ON THIS ASSEMBLY		
C21	0083258	CAPACITR CHIP .1 MF 50V	C1813C104M5XAH	
C22	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C23	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C24	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C25	0078600	NOT ASSIGNED	FOR ENG ONLY	
C26	0078600	NOT ASSIGNED	FOR ENG ONLY	
C27	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C28	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C29	0035656	CAPACITR 100 MF 20V SOLID TANT POL 10%	T362D107K020AS	05397
C30	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C31	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C32	0035656	CAPACITR 100 MF 20V SOLID TANT POL 10%	T362D107K020AS	05397
C33	0035656	CAPACITR 100 MF 20V SOLID TANT POL 10%	T362D107K020AS	05397
C34	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C35	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C36	0078600	NOT ASSIGNED	FOR ENG ONLY	
C37	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C38	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982

TRANSMITTER SUBASSEMBLY (A1/A3/A1) - 309237 (cont.)

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
R23	0083877	RESISTOR 536 OHM RN55C 1% MTL FLM	RN55C5360F	
R24	0077592	RESISTOR 120 OHM 1/4W 5% COMP	RCR07G121JS	01121
R25	0075597	RESISTOR 82 OHM 1/4W 5% COMP	RCR07G820JS	01121
R26	0074714	RESISTOR 3.3K OHM 1/4W 5% COMP	RCR07G332JS	01121
R27	0074733	RESISTOR 18K OHM 1/4W 5% COMP	RCR07G183JS	01121
R28	0174000	NOT USED ON THIS ASSEMBLY		
R29	0078600	NOT ASSIGNED	FOR ENG ONLY	
R30	0074702	RESISTOR 1.0K OHM 1/4W 5% COMP	RCR07G102JS	01121
R31	0071917	RESISTOR 330 OHM 1/4W 5% COMP	RCR07G331JS	01121
R32	0083853	RESISTOR 82.5 OHM RN55C 1% MTL FLM	RN55C82R5F	
R33	0078927	RESISTOR 1.65K OHM RN55C 1% MTL FLM	RN55C1651F	
R34	0078927	RESISTOR 1.65K OHM RN55C 1% MTL FLM	RN55C1651F	
R35	0074710	RESISTOR 2.2K OHM 1/4W 5% COMP	RCR07G222JS	01121
R36	0079123	RESISTOR 301 OHM RN55C 1% MTL FLM	RN55C3010F	
R37	0079123	RESISTOR 301 OHM RN55C 1% MTL FLM	RN55C3010F	
R38	0074698	RESISTOR 560 OHM 1/4W 5% COMP	RCR07G561JS	01121
R39	0083899	RESISTOR 2.26K OHM RN55C 1% MTL FLM	RN55C2261F	
R40	0080380	RESISTOR 2.74K OHM RN55C 1% MTL FLM	RN55C2741F	
R41	0075551	RESISTOR 10 OHM 1/4W 5% COMP	RCR07G100JS	01121
R42	0078600	NOT ASSIGNED	FOR ENG ONLY	
R43	0077592	RESISTOR 120 OHM 1/4W 5% COMP	RCR07G121JS	01121
R44	0075597	RESISTOR 82 OHM 1/4W 5% COMP	RCR07G820JS	01121
R45	0074718	RESISTOR 3.9K OHM 1/4W 5% COMP	RCR07G392JS	01121
R46	0174000	NOT USED ON THIS ASSEMBLY		
R47	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R48	0074727	RESISTOR 10K OHM 1/4W 5% COMP	RCR07G103JS	01121
R49	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R50	0078600	NOT ASSIGNED	FOR ENG ONLY	
R51	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R52	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R53	0078600	NOT ASSIGNED	FOR ENG ONLY	
R54	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R55	0075551	RESISTOR 10 OHM 1/4W 5% COMP	RCR07G100JS	01121
R56	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R57	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
R58	0078600	NOT ASSIGNED	FOR ENG ONLY	
R59	0074706	RESISTOR 1.5K OHM 1/4W 5% COMP	RCR07G152JS	01121
R60	0074722	RESISTOR 4.7K OHM 1/4W 5% COMP	RCR07G472JS	01121
T1	0177027	XFMR 1;1.37CT PRI L 680UH	2745C	
TP1	0082909	TERMINAL PRESS MT DISCONNECT .058-PIN	60599-1	00779

U1	0304112	OSCILLATOR CLOCK 44736 MHZ MDL 4633	PER SA DWG	
U2	0177395	IC CMOS MUX DUAL 4LINE TO 1 3S	74AC11253N	
U3	0173221	IC CMOS GATE NAND 2-IN QUAD	MM74HC00N	
U4	0327878	IC PATTERN GENERATOR		
U5	0327877	IC FRAMER		
U6	0327876	IC CLOCK REC DIGITAL		
U7	0174506	RESISTOR NETWORK 4 100 OHM 2%	4308R-102-101	
U8	0252731	OSCILLATOR,CLOCK 6.176MHZ MDL 4653	03 02003 001 6.176	
U9	0172465	IC CMOS COUNTER 4-BIT BINARY	MM74HC393N	
U10	0174228	IC CMOS MULTIPLEXER 8-BIT/1-CH	MM74HC251N	
U11	0173221	IC CMOS GATE NAND 2-IN QUAD	MM74HC00N	
U12	0327878	IC PATTERN GENERATOR		
U13	0457040	IC FRAMER		
U14	0327876	IC CLOCK REC DIGITAL		
U15	0172455	IC CMOS GATE AND 2-IN QUAD	MM74HC08N	
U16	0089239	IC ECL LINE RECEIVER TRIPLE	MOS MC10116L	
U17	0174227	IC CMOS LATCH 8-BIT ADDRESSABL	MM744C259N	
U18	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U19	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U20	0081658	IC TTL BUFFER HEX OPEN-COL	SN7407N	01295
U21	0174111	IC CMOS LATCH 8-BIT 3-STATE	MM74HC373N	
U22	0177003	IC CMOS TRANSCVR BUS 10-BIT	AM29C861/BLA	
U23	0177003	IC CMOS TRANSCVR BUS 10-BIT	AM29C861/BLA	

TRANSMITTER SUBASSEMBLY (A1/A3/A1) - 309237 (cont.)

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
U24	0177002	IC CMOS BUFFER 10-BIT NONINVRT	AM29C827PC	
U25	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U26	0177002	IC CMOS BUFFER 10-BIT NONINVRT	AM29C827PC	
U27	0084000	VARIES WITH MODEL, SEE HIGHER ASSY FOR PN	PER S A DWG	
U28	0174000	NOT USED ON THIS ASSEMBLY		
U29	0177499	IC CMOS GATE NAND 2-IN QUAD	74AC11000N	
XU4	0177011	SOCKET 68 POS PLCC PC MT	PLCC-68-P-T	
XU5	0177011	SOCKET 68 POS PLCC PC MT	PLCC-68-P-T	
XU6	0177011	SOCKET 68 POS PLCC PC MT	PLCC-68-P-T	
XU12	0177011	SOCKET 68 POS PLCC PC MT	PLCC-68-P-T	
XU13	0177011	SOCKET 68 POS PLCC PC MT	PLCC-68-P-T	
XU14	0177011	SOCKET 68 POS PLCC PC MT	PLCC-68-P-T	
XU18	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU19	0177349	SOCKET 32-PIN PCMT 6-LEAD SPACE	ICT-326-S-TG	
XU21	0086897	SOCKET 20-PIN DIP PC MT	ICT-203-S-T	
XU22	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU23	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU24	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU25	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU26	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
XU27	0173737	SOCKET 24-PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D	
Z1	0327940	HYBRID 75 OHM DSX - 3	PER SA DWEG 327940	
Z2	0327942	HYBRID 75 OHM TRIPPLE BUF	PER SA DWG 327942	
Z3	0327944	HYBRID 100 OHM DS1 OUTPUT	PER SA DWG 327944	

RTC ASSEMBLY (A1/A4) - 327968

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
1	0327887	SUB-ASSY PWB RTC DTA		
U1	0176856	IC MEM CMOSRAM32768X8 120NS ST	CXK58256P12	
U2	0176856	IC MEM CMOSRAM32768X8 120NS ST	CXK58256P12	
U3	0176856	IC MEM CMOSRAM32768X8 120NS ST	CXK58256P12	
U4	0176856	IC MEM CMOSRAM32768X8 120NS ST	CXK58256P12	
U36	0328041	ASSY PAL PROGRAM U36 RTC DTA		
U37	0457021	ASSY PAL PROGRAM U37 RTC		
U39	0309118	ASSY PAL PROGRAM U39 RTC		
U40	0309669	ASSY PAL PROGRAM U40 RTC		
U46	0309115	ASSY PAL PROGRAM U46 RTC		
U47	0457046	ASSY PAL PROGRAM U47 RTC		

RTC SUBASSEMBLY (A1/A4/A1) - 458359

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
1	0458354	PWB RTC DTA		
BT1	0306233	BATTERY NI-CAD 3.6V 100MA HRS		
C1	0083649	CAPACITR 7-25 PF MIN CER DISC PC MT	538-011-B-7-25	72982
C2	0070470	CAPACITR 10 PF 500V SILVER MICA 5%	CD15CD100J03	14655
C3	0035654	CAPACITR 10 MF 25V SOLID TANT POL 10%	T362B106K025AS	05397
C4	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C5	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C6	0035654	CAPACITR 10 MF 25V SOLID TANT POL 10%	T362B106K025AS	05397
C7	0035654	CAPACITR 10 MF 25V SOLID TANT POL 10%	T362B106K025AS	05397
C8	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C9	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C10	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C11	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C12	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C13	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C14	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C15	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C16	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C17	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982

XU38	0173737	SOCKET 24 PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D
XU39	0173737	SOCKET 24 PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D
XU40	0173737	SOCKET 24 PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D
XU41	0173737	SOCKET 24 PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D
XU42	0173737	SOCKET 24 PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D
XU43	0173737	SOCKET 24 PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D
XU44	0173737	SOCKET 24 PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D
XU45	0173737	SOCKET 24 PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D
XU46	0086897	SOCKET 20 PIN DIP PC MT	ICT-203-S-T
XU47	0173737	SOCKET 24 PIN DIP PC MT LOW PROFILE OPEN	610-24-CC-D
Y1	0170302	CRYSTAL 32.768 KHZ .003% PARALLEL RES	32.768KHZ CAL A

CPU ASSEMBLY (A1/A5) - 307219

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
1	0307218	SUB-ASSY PWB CPU DTA		
2	0461503	EPROM & LABEL SET CPU DTA/DAS		
U2	0461503	ASSY PAL PROGRAM U2 CPU DTA		
U3	0461503	ASSY PAL PROGRAM U3 CPU DTA		
U4	0461503	ASSY PAL PROGRAM U4 CPU DTA		
U5	0461503	ASSY PAL PROGRAM U5 CPU DTA		
U44	0458370	ASSY PAL PROGRAM U44 CPU DTA		
U53	0458371	ASSY PAL PROGRAM U53 CPU DTA		
U54	0307263	ASSY PAL PROGRAM U54 CPU DTA		
U55	0458373	ASSY PAL PROGRAM U55 CPU DTA		
U56	0458374	ASSY PAL PROGRAM U56 CPU DTA		

CPU SUBASSEMBLY (A1/A5/A1) - 307218

REF DESIG	PART NO.	DESCRIPTION	VENDOR PART NUMBER	CAGE CODE
BB1	0177102	BUS DSTRBTN 2-LYR VERT MT DIP	QV-2 17.6.3 (.1)	
C1	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C2	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C3	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C4	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C5	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C6	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C7	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C8	0081926	CAPACITR 10 PF 500V CER DISC COH +-.25P	831-COHO-100C	72982
C9	0081792	CAPACITR 30 PF 100V CER DISC U1G 5%	805-024-U1G0-300J	72982
C10	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C11	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C12	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C13	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C14	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C15	0086133	CAPACITR .047 MF 50V CER MONO X7R 10%	C320C473K5R5EA	
C16	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C17	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C18	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C19	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C20	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982
C21	0080139	CAPACITR .1 MF 50V CER MONO -20%+80%	8131-050-651-104Z	72982